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Message from the Editor-in-Chief

Dear Colleagues,

We are very pleased to publish Special Issue 1 for INTE 2015 conference. This issue covers the papers presented at 6th International New Horizons in Education Conference which was held in Barcelona, Spain. These papers are about different research scopes and approaches of new developments and innovation in educational.

Call for Papers

TOJET invites you article contributions. Submitted articles should be about all aspects of educational technology. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET. Manuscripts must be submitted in English.

TOJET is guided by its editors, guest editors and advisory boards. If you are interested in contributing to TOJET as an author, guest editor or reviewer, please send your CV to tojet.editor@gmail.com.

July 2015

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A Blended Learning Approach To Enhance Learning And Teaching Of Fluid Mechanics: An Example Demonstrating Success

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ABSTRACT

Fluid Mechanics is a core subject in civil, mechanical, chemical and aeronautical engineering undergraduate courses. This subject needs a relatively strong background in mathematics and physics, which is not well satisfied for a good number of students enrolled to fluid mechanics subject in Australian universities. This paper presents a case study on teaching and learning of fluid mechanics at University of Western Sydney (UWS), Australia. In UWS, fluid mechanics was rated as a high-failure subject based on the data over a decade. More recently, UWS has adopted a Blended Learning Approach (BLA) to teach fluid mechanics to its undergraduate classes. In the adopted BLA, various learning materials have been made available to the students such as online recorded lectures, online recorded tutorials, hand written tutorial solutions, discussion board and online practice quizzes. Based on the data of over 734 students over 4-year period, it has been shown in this paper that a BLA has improved the learning experience and success rate of the fluid mechanics students in UWS. The findings of this paper would be useful in adopting a BLA to other subjects to enhance the learning of fluid mechanics and similar subjects.

INTRODUCTION

Engineering courses have traditionally been delivered face-to-face for many years; however, due to technological developments in the last three decades, courses are being offered in a number of different modes. Based on online proportion of the course delivery, tertiary courses may be categorized into four types: (i) traditional: 0% online course component i.e. content is delivered in writing or orally; (ii) Web facilitated: 1 to 29% of the course content is delivered online; (iii) blended/hybrid: 30 to 79% of the course content is delivered online; (iii) online: 80 to 100% of the course content is delivered online (Allen and Seaman, 2011). In some developing countries, traditional mode of engineering course delivery is still practiced; however, in many developed countries, some universities and colleges have been offering engineering courses online or at least planning in this direction. However, most of the engineering schools in the developed worlds are still doing face-to-face delivery, but with varying degrees of online activities (i.e. blended delivery). Blended learning approach (BLA) can be defined as a flexible learning and teaching method, which attempts to use the best of the face-to-face and online course delivery modes to achieve the desired learning objectives for the students.

The BLA has direct links with teacher-centered paradigm of teaching and learning and student-centered one. The teacher-centered paradigm is viewed in line with the traditional on campus face-to-face delivery of engineering course where 'chalk and talk' approach still plays a major role. The student-centered approach is more in line with the blended learning (Jaeger and Adair, 2014) and online delivery mode. This mode is supported by a variety of tasks including problem-based and case-based learning and use of immersive scenarios and role-play and group works. In the teacher-centered approach, students need to show to the teachers that they have mastered the skills to the teacher's satisfaction. In the student-centered approach, students themselves can assess their ability. For example, Reeves and Laffey (1999) mentioned that in an undergraduate engineering course, problems can be defined in such a way that students have to learn, assess and demonstrate their learning through challenging tasks such as planning a mission to Mars and designing a research station including a renewable power source to sustain life after the establishment of the station.

In a non-engineering case, Pennell et al. (1997) mentioned about a web-based task where students need to learn business communication skills by accepting temporary employment in a virtual recording company. In this job, students have to make appointments, keep diary, interview employees, and write memos, letters and reports. In a fluid mechanics course, a group of students can be asked to design a water supply scheme for a rural community that involve interviewing stakeholders e.g. local people, government officials, political leaders and professional engineers, and collate data, carry out data analysis, complete design of water pipeline and drainage networks, present design to the stakeholders and hypothetical clients. However, in this task some guidance and intervention by the teacher or a senior student can be beneficial to monitor the learning process and to provide progressive feedbacks to the students for attaining an acceptable level of learning at the conclusion of the task. Tasks can be designed to reduce the roles of a teacher, for example, on-line assistance can be provided via skype meetings or other technology assisted off campus meetings. Reeves et al. (2002) argued that design of complex activities is central component of course design for online learning, which is also essential for blended learning. This has

also been supported by various theories of learning such as situated cognition (McLellan, 1996), anchored instruction (Bransford et al., 1990), problem-based learning (Savery and Duffy, 1996) and cognitive flexibility theory (Spiro et al., 1987).

In recent years, the use of learning management systems (LMSs) (e.g. proprietary Blackboard and open-source Moodle software) has become widespread (Martin, 2012). Massive open online course (MOOC) may follow some of the conventions of an ordinary course (e.g. predefined timeline and weekly topics), but MOOC may not carry fee, no prerequisite, and no formal accreditation (McAuley et al., 2010). These types of courses may attract a great number of students. For example, Lewin (2012) reported that one course, offered by a Stanford faculty in 2011, attracted 160,000 students; approximately 23,000 of these students completed this 10-week course. Martin (2012) reported a Fall 2011 Stanford University course consisted of weekly lectures containing two or three 45-minute topics that consisted of 15 to 20 short videos, each video containing multiple-choice or fill-in-the-value types embedded questions for students to attempt. The class server was able to grade the students immediately. These lectures were motivated by Khan Academy style. The course though online, it was like a typical lecture. In a blended course offered in the University of Massachusetts Lowell by Martin (2012), a project was to be completed by students. The teacher met once a weekly for a 75-minute roundtable session where discussions focused on confusing topics. The ‘flipped class room’ concept involves use of recorded lectures in the web and class room time for hands-on learning activities (Day and Foley, 2006). Mere use of collaborative eLearning or of active constructivist pedagogy, does not guarantee good outcomes. For example, when students perceive that a course is badly implemented where they are overloaded with work and there are no clear goals and poor feedback, the students may rate the course poorly irrespective of pedagogy or technology being used (Ellis et al., 2008). In fluid mechanics, a good number of students in UWS believe that they are overloaded with work in fluid mechanics.

Most eLearning in the universities combines eLearning with face-to-face activities (e.g. BLA); however, there are growing numbers of universities that are reducing the face-to-face activities, mainly to reduce the cost, to meet the needs of students who are working while studying and who do not like to travel to campuses. Thus, many universities would like to develop fully online courses. Ellis et al. (2008) found a close association between conceptions of learning through discussions with approaches to face-to-face and online discussions and learning outcomes. Other have pointed out limitations of online courses e.g. Martin (2012) stated that a modern university is a much larger ecosystem than its collection of courses; students attending on-campus courses derive great value from being in contact with their peers, involving with leadership roles in campus and engage with research labs. This shows that BLA is preferable to online course delivery.

Chandler et al. (2013) presented assessment of a BLA completed by more than 6,000 learners in USA and internationally. They noted that in terms of achieved knowledge and overall satisfaction, online instruction combined with face-to-face hands-on activities exhibited a statistically significant improvement in the learners' understanding of the course material. Allen and Seaman (2011) presented a report on online education in the US based on responses from over 2,500 colleges and universities. They noted that in USA about 6 million students took at least one online course in fall 2010, and 31% of all higher education students took at least one course online. They noted that one-third of all academic leaders continue to believe that the learning outcomes for online education are inferior to those of face-to-face instruction. However, academic leaders from online course offering institutions had much more favorable opinion on online courses.

In this paper, it is argued that BLA can be better suited in teaching so called ‘difficult’ subjects like fluid mechanics. In this regard, a case study is presented for fluid mechanics class in University of Western Sydney (Australia). The students’ data of four recent years are used in this study to demonstrate the effectiveness of BLA in teaching fluid mechanics.

FLUID MECHANICS TEACHING AND LEARNING ISSUES IN UNDERGRADUATE CLASS

Fluid mechanics is regarded one of the most challenging subjects in undergraduate engineering course. This subject is delivered generally in the second year in a number of undergraduate engineering courses (Rahman and Amin, 2014). Learning of fluid mechanics is reported to be challenging due to its complex nature and the level of mathematics involved (Alam et al., 2004). Many students find this subject difficult due to inability in differentiating the concepts between solid and fluid mechanics; in the former, there is no internal frictional resistance (i.e. viscosity), turbulence, hydraulic jump and vortex unlike fluid mechanics. In Australia, many students enrolled in fluid mechanics lack necessary mathematical background to understand the concepts involved in fluid mechanics, which often lead to the their failure in the first attempt of the subject. Fluid mechanics involves use of large numbers of variables along with a many equations of complex nature. The lectures are heavily inter-dependent, and hence students missing a few lectures often struggle in catching up.

Depending on the new e-generation's learning habits, the delivery of fluid mechanics and similar heavy subjects need a complete overhaul, which are still being delivered in the old-fashioned way in Australian universities (Hadgraft, pers. comm., 2013).

There have been numbers of studies dealing with learning aspects of fluid mechanics and related subjects. For example, Leal (1991) pointed out that critical attention would be needed to solve problems in the areas of teaching and research related to fluid mechanics. Baldock et al. (2006) presented a combined task of problem-based and project based learning where physical model based data were compared in the areas of fluid flow modeling. The approach enabled students preparing high quality professional reports in fluid mechanics. Chanson (2004) stated that the influence of fieldwork on learning hydraulics courses in an Australian university was quite high where combination of lectures and field works enabled students to achieve better learning outcomes.

In another study, Johnson (1999) highlighted the weaknesses of having traditional lecture-based delivery of hydraulic engineering. Two different effective teaching techniques were proposed by him; firstly, the problem-based learning to enable students to take responsibility on assigned tasks by taking an active role in their learning. The second approach was based on a cooperative learning that prepared students to work in a small team environment consisting of students and an instructor using small project based work and assignments. Alam et al. (2004) presented an eLearning method of teaching fluid engineering subjects that involved hands-on practical experiments, video images of real-world laboratory experiments and simulations from computer-based exercise. Furthermore, Alam et al. (2007) proposed a three-step teaching approach in fluid science that could greatly enhance students' learning outcomes, be cost effective, user-friendly and likeable by students, which was composed by video clips of laboratory experiments and examples from computer simulation. Gotler (2006) presented an eLearning method of teaching laboratory components of fluid mechanics in Washington State University where students were allowed to work in structured groups, which enhanced communication skills of the students.

FLUID MECHANICS COURSE IN UNIVERSITY OF WESTERN SYDNEY (UWS)

Fluid mechanics is taught in the first semester of second year of the four-year bachelor degree courses in UWS. It is a core subject in three degrees: Bachelor of Civil Engineering, Bachelor of Environmental Engineering and Bachelor of Mechanical Engineering. It has two pre-requisites, Mathematics 1 and Physics 1. Fluid mechanics is the first course in fluid science and is a prerequisite to a number of subjects in later years of the degree, e.g. hydraulics, hydrology and fluid dynamics. The subject content of fluid mechanics at UWS includes fluid properties, fluid statics, energy equations, momentum, dimensional analysis and similitude, flow in conduits, introductory boundary layer concepts, introductory open channel flow, flow measurements, drag and lifts. The subject content of fluid mechanics in UWS is very similar to other engineering schools in Australia. The class composition of fluid mechanics in UWS in year 2014 is shown in Table 1. Numbers of interesting features may be highlighted e.g. only 8% students are female, which is typical in engineering courses in Australia as engineering profession is regarded as male-dominated profession in Australia (Rahman et al., 2008). About 40% students do not come directly from school. There are only 17% international students, which is much lower than many other courses in UWS and other Australian universities. There are 17% students who are repeating the subject in 2014.

Table 1: Student profile for fluid mechanics subject in UWS (2014)

No. of enrolled students	222				
Gender mix	Male: 8%	Female: 92%			
Domestic vs. international	International: 17%	Domestic: 87%			
Educational background	School: 58%	Diploma: 16%	Higher education: 11%	Others: 15%	
Language spoken at home	English: 57%	Arabic: 17%	Hindi: 5%	Chinese: 4%	Others: 17%
Country of birth	Australia: 59%	China: 5%	India: 4%	Iraq: 3%	Others: 29%
Attempt status	1st attempt: 84%	2 nd attempt: 13%	3 rd attempt: 3%		

BLENDED LEARNING APPROACH IN TEACHING AND LEARNING OF FLUID MECHANICS IN UWS

BLA has been adopted to teach fluid mechanics in UWS since 2013 with the author of this paper as subject coordinator. The author started teaching of fluid mechanics in UWS since 2002. The adopted BLA components are illustrated in Figure 1. The lecture time was used following flipped class room approach i.e. the time was effectively used to show selected YouTube lecture to demonstrate principles like momentum, Bernoulli equation, floods, aerodynamic effects, open channel flow and measurement of streamflow. This time was also used to explain the confusing topics such as when one can ignore velocity in applying energy equation, how to use Moody diagram and to answer questions on confusing issues rose by the students. At the beginning of each lecture, a good revision was provided covering the previous lectures. Interactive discussion on difficult topics was initiated by the lecturer, which engaged the students very well. Progressive informal feedbacks were obtained by the lecturer through private discussion with many students. The attendances to lectures were about 30% to 40%, but on three days of in-class quizzes, the attendance was about 98%. The final lecture was on the reflection of the course, which was well attended. The struggling students were encouraged to consult with the lecturer to assist in grasping the fundamental concepts of fluid mechanics i.e. understanding the basic equations, units of the variables and use of online materials. It has been found that students attending lectures and utilizing the time by engaging with the lecturer and fellow students were performing better in the assessment.

The vUWS (online system to host subject content such as lecture notes, videos, tutorial solutions and practice quizzes) was used to send notices to students (with immediate email to students) for issues that were found to be confusing/important to students. Students did not use discussion board that much; this is because they preferred discussing issues face-to-face during lecture time. Recorded tutorials were watched very frequently, in particular before the in-class quiz tests. An informal feedback session was conducted on a sample of students who rated the tutorial class and hand written tutorial solutions were the most useful resources, followed by the revision of lectures at the beginning of lecture time. Text book was regarded almost useless, and lab report writing was regarded to be the most difficult exercise, in particular, conducting a literature review on the topic of lab experiments undertaken by the students.

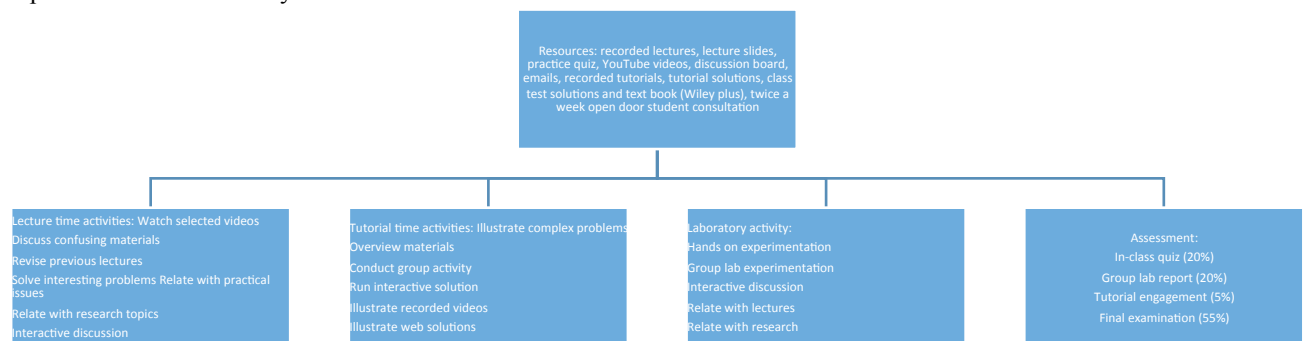


Figure 1: Components of blended learning approach (BLA) in fluid mechanics

RESULTS DEMONSTRATING SUCCESS OF THE BLENDED LEARNING APPROACH in UWS

The success of adopting BLA in teaching of fluid mechanics at UWS was assessed by (i) student feedback reports; (ii) results/grades of students; and (iii) informal peer feedbacks.

The students' feedback on unit (SFU), though cannot be taken as the sole measure of the quality and effectiveness of a subject delivery, it gives a good impression of the quality of offering. For fluid mechanics, the SFU was continuously poor for years 2002 to 2013 (12 years) and was in the list of concerned units in UWS. The lectures of the subject was changed few times by bringing senior academics (one full Professor, one Associate Professor and two Senior Lectures, all of them are research active and highly experienced academics having experiences of lecturing in high-notched universities). However, situations with SFT showed hardly any sign of progress. Since introduction of blended learning approach in 2013, a notable improvement was seen in SFU as illustrated in Table 2.

The results and grades of the students also improved remarkably in years 2013 and 2014 compared with years 2011 and 2012 as can be seen in Figure 2. This shows an increase in high distinctions (HD)/distinctions (D) numbers and a reduction in the number of failing students, with an overall increase of the numbers of students successfully completing the subject. It was also found that the numbers of students achieving higher than 90% increased for the BLA case compared with the traditional approach. Table 2 presents summary of SFU reports

(with percentages of students responded to university administered survey were in the range of 30% to 40%, a typical rate in UWS). Table 2 clearly shows that BLA increases the overall student-satisfaction for all the surveyed items. The overall percentages of students ‘strongly agreed’ and ‘agreed’ are 11% higher in year 2013 (BLA case) compared with 2012 (traditional approach); in 2014 (BLA case), it is 33% higher than 2012 (traditional case). The overall score in 2012 is the lowest, which triggered the adoption of the BLA for the subject in subsequent years.

Table 2: Analysis of student feedback on unit (SFU) reports traditional vs BLA cases (% of students ‘strongly agreed’ and ‘agreed’ with the survey item shown in column 1)

Survey item	2011 (%) (traditional)	2012 (%) (traditional)	2013 (%) (BLA)	2014 (%) (BLA)
The subject (unit) covered what the learning guide said it would	79	68	84	98
I was able to see the relevance of this unit to my course	78	61	84	98
The learning activities in this unit have helped my learning	75	58	79	92
The assessments in this unit have helped me learn	72	65	63	94
I was able to learn from feedback I received in this unit	53	65	54	90
There were clear guidelines for all assessment tasks in this unit	63	45	71	92
The learning resources provided for this unit helped me to engage in learning	66	64	67	89
The unit provided a reasonable amount of flexibility for study	66	65	63	94
The teaching & learning spaces used for this unit were adequate	71	60	84	98
The amount of work required in this unit was reasonable	74	55	75	94
In this unit people treated each other fairly & with respect	75	74	76	96
This unit helped me develop my skills in critical thinking, analysing, problem solving & communicating	69	54	66	90
Overall, I've had a satisfactory learning experience in this unit	69	58	67	96
Overall Average	70	61	72	94

A number of UWS academics expressed explicit positive view of the subject (with BLA), in particular by the Director of Academic Program (DAP) and Deputy Dean. A number of academics in UWS have been encouraged to adopt a BLA e.g. soil mechanics and hydrology. More recently, UWS has appointed a supporting team to assist in developing the resources for BLA offering of the subjects e.g. recording the tutorial classes before the class and placing them in YouTube, placing online practice quizzes in the web and monitoring and reporting their use by the students to the unit coordinator.

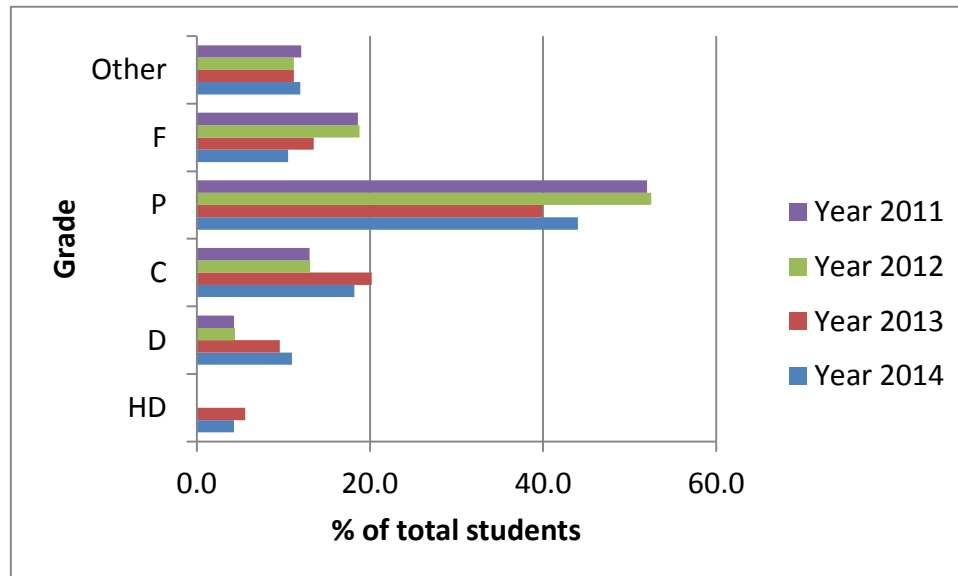


Figure 2: Student grades in traditional vs. blended learning approaches

CONCLUSIONS

This study examines the effectiveness of blended learning approach (BLA) in teaching and learning of fluid mechanics in University of Western Sydney (UWS), Australia. Before introduction of the BLA, fluid mechanics was regarded to be a subject of 'high failure rate' with relatively poor student feedback on unit (SFU) reports. Since the introduction of the BLA in fluid mechanics subject in UWS in 2013, significant improvements in students' learning have been observed, as demonstrated by more positive student survey reports. The particular advantages of the BLA have been found to be the opportunity it offers to the students in making a revision of the course materials for the difficult topics by replaying the recorded lectures, pre-recorded tutorial videos, practicing the online quizzes and using the lecture and tutorial times in engaging with fruitful discussions with the teachers where a big picture of the subject is demonstrated by linking the theories with real world examples and recent research/developments in the subject. The BLA has given the opportunity of catering for the students' need as they require, e.g. less capable students get a chance to catching up, but the higher-end students can also enjoy the challenges embedded in topics covered in fluid mechanics. The findings of the study are expected to encourage academics of UWS and other universities in adopting the BLA in developing their subjects.

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References

- Alam, F., Tang, H., & Jiyuan, T. (2004). The development of an integrated experimental and computational teaching and learning tool for thermal fluid science, *World Transactions on Engineering and Technology Education*, 3, 2, 249-252.
- Allen, I.E. & Seaman, J. (2011). *Going the Distance: Online education in the United States, 2011*. Babson Survey Research Group.
- Alam, F., Dilla, E., Subic, A., & Tu, J. (2007). A three-step teaching and learning method in laboratory experiments for a thermal fluids course. *World Transactions on Engineering and Technology Education*, 6, 1, 13-16.
- Baldock, T. E., & Chanson, H. (2006). Undergraduate teaching of ideal and real fluid flows: The value of real-world experimental projects. *European Journal of Engineering Education*, 31(6), 729-739.
- Bourne, J., Harris, D., & Mayadas, F. (2005). Online engineering education: Learning anywhere, anytime. *Journal of Engineering Education*, 131-145, Paper 1. http://digitalcommons.olin.edu/facpub_2005/1.
- Bransford, J.D., Vye, N., Kinzer, C., & Risko, V. (1990). Teaching thinking and content knowledge: Toward

- an integrated approach. In B.F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 381-413). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Chandler, T., Park, Y.S., Levin, K.L., & Morse, S.S. (2013). The incorporation of hands-on tasks in an online course: an analysis of a blended learning environment. *Interactive Learning Environments*, 21, 5, 456-468.
- Chanson, H. (2004). Enhancing Students' Motivation in the Undergraduate Teaching of Hydraulic Engineering: Role of Field Works. *Journal of Professional Issues in Engineering Education and Practice*, 130(4), 259–268.
- Day, J. and Foley, J. (2006). Evaluating a Web lecture intervention in a human-computer interaction course. *IEEE Transactions on Education* 49, 4 (Nov. 2006).
- Ellis, R.A., Goodyear, P., Calvo, R.A., Prosser, M. (2008). Engineering students' conceptions of and approaches to learning through discussions in face-to-face and online contexts. *Learning and Instruction*, 18, 3, 267-282.
- Golter, P. B. (2006). Combining modern learning pedagogies in Fluid mechanics and Heat Transfer. Unpublished Masters of Science Thesis, Washington State University.
- Hadgraft, R. G. (2013). Teaching of Fluid mechanics Method: Do we need a big change? Personal communication, Sydney, July 2013.
- Jaeger, M. & Adair, D. (2014). The influence of students' interest, ability and personal situation on students' perception of a problem-based learning environment. *European Journal of Engineering Education*, 39, 1, 84-96.
- Johnson, P. A. (1999). Problem-based, cooperative learning in the engineering classroom. *Journal of Professional Issues in Engineering Education and Practice*, 125, 1, 1999.
- Leal, L.G. (1991). 4 Challenges and Opportunities in Fluid mechanics and Transport Phenomena. *Advances in Chemical Engineering*, 16, 61–79.
- Lewin, T. (2012). Instruction for masses knocks down campus walls. *New York Times* (Mar. 4, 2012).
- Martin, F.G. (2012). Will massive open online courses change how we teach? *Communications of the ACM*, August 2012, 55, 8.
- McAuley, A., Stewart, B., Siemens, G., and Cormier, D. (2010). The MOOC Model for Digital Practice; http://www.elearnspace.org/Articles/MOOC_Final.pdf.
- McLellan, H. (Ed.). (1996). *Situated learning perspectives*. Englewood Cliffs, NJ: Educational Technology Publications.
- Pennell, R., Durham, M., Ozog, M. & Spark, A. (1997). Writing in context: Situated learning on the web. In R. Kevill & R. Oliver & R. Phillips (Eds.), *What works and why: Proceedings of the 14th Annual Conference of the Australian Society for Computers in Learning in Tertiary Education* (pp. 463-469), Perth, WA, Curtin University.
- Rahman, A., Shanableh, A. and Shrestha, S. (2008). Integrating Teaching and Research with Community Service, Environmental Awareness and Environmental Engineering Education in Australia: A Review, pp. 415-421. Published by College of Graduate Studies and Research, University of Sharjah.
- Rahman, A., Al-Amin, M. (2014). Teaching of Fluid Mechanics in Engineering Course: A Student-Centered Blended Learning Approach, In 'Using Technology Tools to Innovate Assessment, Reporting, and Teaching Practices in Engineering Education', edited by F Alam, IGI Global Publisher, 12-20.
- Reeves, T.C. & Laffey, J.M. (1999). Design, assessment and evaluation of a problem-based learning environment in undergraduate engineering. *Higher Education Research and Development Journal*, 18(2), 219-232.
- Reeves, T.C., Herrington, J. & Oliver, R. (2002). Authentic activities and online learning. *HERDSA*, 562-567.
- Savery, J.R., & Duffy, T.M. (1996). Problem based learning: An instructional model and its constructivist framework. In B.G. Wilson (Ed.), *Constructivist learning environments: Case studies in instructional design* (pp. 135-148). Englewood Cliffs, NJ: Educational Technology Publications.
- Spiro, R.J., Vispoel, W.P., Schmitz, J.G., Samarapungavan, A., & Boeger, A.E. (1987). Knowledge acquisition for application: Cognitive flexibility and transfer in complex content domains. In B.K. Britton & S.M. Glynn (Eds.), *Executive control processes in reading* (Vol. 31, pp. 177-199). Hillsdale, NJ: Lawrence Erlbaum Associates.

A New Horizon In The Education Of Multilingual And Multicultural Children: A Speech Therapeutic Story As A Cutting-Edge Form Of Support In Linguistic And Emotional Development

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ABSTRACT

Multicultural environments are now a widespread phenomenon, caused mainly by migrations at continental and global levels. They are primarily economically and educationally driven but very often are formed due to private, family reasons. It is family that is the most important basic and primordial milieu for human development. It is therefore crucial for multicultural (and often multilingual) families to implement a coherent and consistent plan for upbringing children – one which respects the coexistence of different traditions, languages, beliefs, and habits in the child's immediate environment. It is also necessary to pay special attention to the emotional (cultural eclecticism, i.e. language, behaviour, or appearance different than that of peers, may trigger problems with adaptation to kindergarten or school environment) and linguistic (children may experience difficulties in the parallel language acquisition in terms of vocabulary and grammar, often articulation of sounds too) development of children. A speech therapeutic story – a tool applied in the logopaedic prevention and therapy – may also be used with multilingual and multicultural children. It is a new support proposal for upbringing and educating such children, both in terms of building their identity and helping them improve their languages. By identifying with the story's main character, the child copies appropriate behaviour mechanisms (in emotionally difficult situations) and language patterns (applicable in the languages spoken in the family).

Keywords: bilingualism, multiculturalism, multilingualism, multicultural education, family cultural *eclecticism*, multicultural family, speech therapeutic story, fairy-tale therapy, therapeutic story, bibliotherapy, emotional support, speech therapy, logopaedic prevention, therapy of speech impediments and language disorders

A speech therapeutic story is a new solution used in logopaedic prevention and therapy, which provides the child with a parallel, two-dimensional support in linguistic and emotional development (Beltkiewicz; 2013). Emotions are closely related to linguistic communication. The relationship between the emotional sphere and linguistic activity is bilateral: speech impediments and disorders cause fear of speaking which mainly stems from fear of being incomprehensible and rejected by the listener, while negative emotions trigger tension that often makes it impossible to speak freely.

Speech therapeutic stories may present various logopaedic issues. As of today, there are stories which address dyslalia, stutter, premature loss of teeth in children, and short sublingual frenulum. The latest story concerns a different issue – children multilingualism and multiculturalism, since such circumstances often require instruction in pronunciation and as well as emotional support.

Multilingualism & multiculturalism as an inspiring integration

Multicultural environments are now a widespread phenomenon, caused mainly by migrations at continental and global levels. Globalization leads to the intensification of international relations in various areas such as education, entertainment, or work. Therefore, multicultural milieus are formed in educational institutions, workplaces, and families (Beltkiewicz; 2015). Family is the first, primary, and crucial environment for a developing human being. It is the “oldest institution of social life” (Milerski and Śliwerski; 2000), which equips a person with values, patterns of behaviour, knowledge of the world, and cultural symbols. Thus, a multicultural family has a special mission – “to pursue a balanced and compromise-based model of upbringing which will familiarize the offspring with the traditions, customs, language, and beliefs coexisting in a family environment” (Beltkiewicz, 2015).

▪ Different cultures

Multiculturalism should be based on respect for the elements of different cultures which coexist in the community. What is important is respect which “conveys a message of symmetry and reciprocity” (Koźmińska and Olszewska; 2007). Multicultural families are marked by “the flow of cultural elements or entire cultural complexes or configurations between different cultures” (Sztompka; 2002) which is referred to as cultural diffusion. This phenomenon has different degrees of intensity and is particularly noticeable in families where

spouses come from different cultures, often extremely disparate ones. Sometimes, however, that coexistence is disturbed. There is a cultural dissonance, i.e. a kind of “conflict of cultural content (...) imposed on the individual by various cultures he is simultaneously subject to” (Sztompka; 2002). Conflict situations where people disrespect other cultures, undermine beliefs, and ignore traditions are educationally unfavourable. It is also unacceptable to force the child to make unambiguous choices. In multicultural families, children have the right to know the descent, traditions, and beliefs of both parents, provided it occurs in the atmosphere of mutual consent, harmony, and respect. Such knowledge is the foundation of one's identity.

▪ Different languages

The culture of a given community – most often of a nation – together with its other products is represented by language. As a result, the multiculturalism of a family usually entails multilingualism, particularly in children. Raising a child in a multilingual family (typically bilingual) in which parents represent different nationalities, cultures, and languages is a widely considered issue (Belkiewicz; 2015). In such families, the superiority of one language over the other is determined by a number of additional factors such as place of residence, which parent usually takes care of the child, the mother's and father's language of communication, closer relations with relatives on the mother's or father's side, etc. Researchers and practitioners are not unanimous about such circumstances, and it is difficult to take the one and only right approach, as each family situation is very individual and different. It is undeniable, however, that a child in a multilingual family should be taken very good care of. From the earliest stages of life, such a child is “immersed” in the coexisting languages. It is necessary to organize the linguistic material and to spontaneously direct the child's utterances. Apart from cultures, the child has the right to learn how to speak the coexisting languages. It is crucial to facilitate this process for the child by providing him with a clear taxonomy of phonetic, phonological, semantic, and syntactic systems of these languages.

▪ Different environments

Apart from the family or home milieu, a child from a multilingual, multicultural family also lives in other environments. Kindergarten and school are additional formalized groups with which the child integrates through regular contacts and cooperation. While for the family, the child's “eclecticism” is something obvious and natural, the educational environment, especially if it is culturally and linguistically homogeneous, may approach the multilingual, multicultural child with a certain degree of curiosity or even mistrust. Being different in terms of behaviour, appearance, beliefs, or language still triggers intolerance, suspicion, and even hostility in many people. The child, who is accepted and loved by the family, may be rejected by kindergarten or school peers. During this period, it is necessary to provide the child with emotional support and to teach him the mechanisms of coping with negative emotions and fear. It is highly recommended to conduct classes to give the child the opportunity to integrate with other children during which the uniform group will get to know the new peer slightly better, while the multicultural, multilingual child will feel accepted by his kindergarten or school community. For this purpose, fairy-tale therapy or drama can be used.

Emotion & language – a speech therapeutic story

The above-mentioned fairy tale therapy is “a therapeutic method which uses a literary text and a text specially designed by therapists for patients who struggle with specific problems” (Molicka; 2011). Speech therapeutic stories are used both as a form of prevention of potential emotionally difficult situations and as a remedy or a therapeutic measure in a problematic situation that has already arisen. Speech therapeutic stories are based on this idea, focusing on children's logopaedic problems that concern both disturbed language communication and the associated negative emotions. It is worth noting that the child might feel the fear on multiple stages: from the moment he/she becomes aware of his/her linguistic imperfection when compared to a peer group to diagnosis and speech therapy after which parents often expect fast and long-lasting results.

Speech therapeutic stories combine the plot of a therapeutic fairy tale which motivates, inspires positive attitude, raises self-esteem, restores faith in success, and reduces fear with a series of logopaedic exercises in order to train and stimulate a specific skill or competence or to eradicate a specific disorder or impediment. These stories are used successfully at the stage of pre-school and early school education (age 3-10). They can be presented in a traditional way, i.e. a therapist reads out or tells a story, using props and hand puppets, or in a more modern way – with multimedia, which facilitate the child's interaction with the fairy-tale world and contribute to the proper reception and imitation, especially when it comes to the moves and arrangements of speech organs presented through animation (Belkiewicz; 2014).

▪ Protagonists and organic characters

The effectiveness of fairy tale therapy is based on the child's identification with the main character, which makes the child imitate and adopt certain proper activities, solutions, attitudes, and behaviours. The protagonist's actions should be rational and possible to implement by the child in his life.

A speech therapeutic story presents not only the activities of a child character (it may be a human, flower, tree, animal, or an abstract creature) but also the activities of an organic character (Bełtkiewicz; 2013), who usually personifies a speech organ to be improved by the child (typically the tongue – the most mobile articulator, whose reduced performance causes a lot of defects and disorders).

Identification can take place on two planes of analogy: in one stage or in two stages.

1st degree analogy

Example: The child compares himself to a little animated tree named Little Willow, while the tongue in the mouth is compared to a little owl, also animated, which lives in a tree hollow and makes it possible for the tree to communicate (single analogy plane, one stage).



Fig. 1. A print screen of a speech therapeutic story titled “Zima – przeszkoda u Wierzbki” (“Winter –Little Willow and its obstacle”), Drabina Rozwoju Foundation, The Aktywne Łącza Multimedia Expert System, www.aktywne.lacza.com

/1/ The owl is painting the walls of the hollow – the child (the little listener) is massaging his cheeks with the tongue from the inside – exercises to improve the work of the tongue after frenulectomy.

2nd degree analogy

Example: The child is compared to a little girl named Rózia, who imagines that her tongue is a dinosaur named GADajek, which lives in a cave (the mouth) (double analogy plane, two stages).



Fig. 2. and 3. A print screen of a speech therapeutic story titled “Rrromek i Rrradek” (“Rrromek and Rrradek”), DoDo4Story Publishing House

/1/ GADajek, a figment of Rózia's (and the child listener's) imagination, is painting the cave walls.

/2/ Rózia (and the child listener) is exercising the tongue by massaging the cheeks from the inside with the tip of the tongue – exercises to improve the tongue; preparation before training the “r” sound.

The choice between a single- or double-stage analogy should be dictated by the child's age and imaginative abilities. It is worth emphasizing that some profound developmental disorders prevent the child from discovering the analogy between the character's adventures and his own experiences on his own and thereby make the use of the presented solutions impossible.

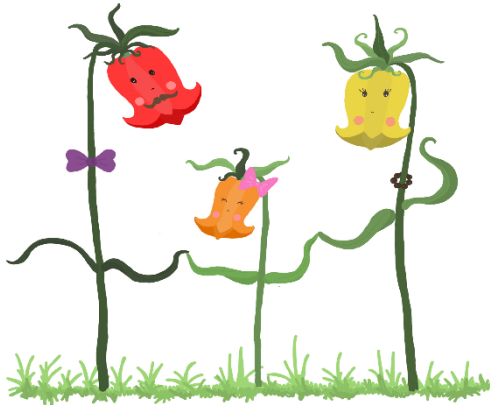
▪ Auxiliary characters

Other extremely important speech therapeutic story characters include advisers and helpers who support the main character in self-improvement and persistent work. Their presence is intended to accustom the child to a speech therapist (often also to an orthodontist, surgeon, or a dentist, since logopaedic problems are frequently

linked to irregularities in the oral cavity and the need for a surgery and/or medical consultations). Systematic practice always ends in success, further reinforced by presenting relatives and friends with the positive results and by sharing the child's new skill with other people in need of the same assistance.

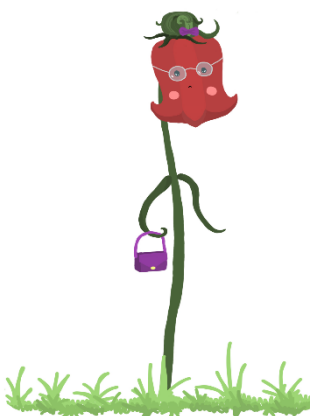
“Little Orange Lily” – colourful bilingualism

As mentioned earlier, a speech therapeutic story may relate to various child logopaedic problems, including difficulties with pronunciation in the situation of bilingualism (especially the sounds that are written with the same letter but differ in pronunciation).



One example is the story called „Little Orange Lily,“ where the main character Paulinka comes from a bilingual, bicultural (two-colour) family. She is an unusual little flower who can speak thanks to Little Bumblebee buzzing at the bottom of the calyx (analogy with the tongue). Her mother Żaneta is a yellow lily, while her father Cyril is a red lily, hence Paulinka's unique colour (the combination of her parents' colours). The parents come from different lands and speak different languages – yellow and red (though when dad moved to mum's land, where the family currently lives, he also learned to speak the yellow language correctly).

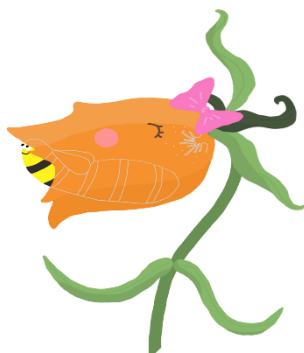
Fig. 4. Presentation of the main character and her environment, the illustration for the speech therapeutic story titled “Pomarańczowa Lilijka” (“Little Orange Lily”), Biblioterapeuta (1/2015)



Little Orange Lily is required to speak correctly in the yellow language at school and at home and in the red language when talking to her father. In particular, Paulinka is struggling to distinguish between the pronunciation of the “r” sound, which in her mother's language sounds like the Polish alveolar “r”, while in the father's language like the French dorsal/uvular “r”.

Paulinka receives help from her aunt Brygida (also from a bilingual, bicultural family – red-and-black), who is a relative from the father's side, a teacher, and a translator.

Fig. 5. The appearance of the advisor-character, the illustration for the speech therapeutic story titled “Pomarańczowa Lilijka” (“Little Orange Lily”), Biblioterapeuta (1/2015)



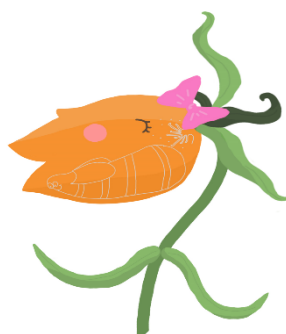
The aunt explains the difference, presents the place of articulation for both sounds, and recommends exercises.

Examples:

Little Bumblebee is licking off the pollen from behind the upper petals. With the mouth wide open, the child is “brushing” his upper teeth from the inside with the tip of the tongue.

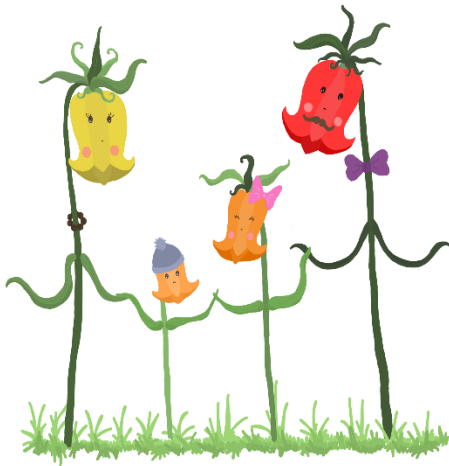
Fig. 6. Articulatory motor exercises – front of the oral cavity, the illustration for the speech therapeutic story titled “Pomarańczowa Lilijka” (“Little Orange Lily”), Biblioterapeuta (1/2015)

Lying flat, Little by moving his rump With a slightly open back as possible.



Bumblebee withdraws to the bottom of the calyx back. mouth, the child tries to move the tongue as far

Fig. 7. Articulatory motor exercises – back of the oral cavity, the illustration for the speech therapeutic story titled “Pomarańczowa Lilijka” (“Little Orange Lily”), Biblioterapeuta (1/2015)



Little Orange Lily learns to differentiate the sounds and masters the articulation of 'r' in both languages.

Paulinka's baby brother is born, who – while learning how to speak – may experience similar difficulties like his big sister. Luckily, Paulinka comes to the rescue by demonstrating the outcome of the exercises – her new skills.

Fig. 8. Success, presentation of the results, helping her little brother, the illustration for the speech therapeutic story titled “Pomarańczowa Lilijka” (“Little Orange Lily”), Biblioterapeuta (1/2015)

This speech therapeutic story has been used successfully when working with Polish-French children in order to develop the correct pronunciation of the 'r' sound and help them integrate with peers. A family tree with indications of the impact of languages, cultures, and places in the child's family is often created in order to strengthen the child's identity.

The solution has garnered favourable opinions among linguists, cultural experts, and teachers. Justyna Budzik wrote: “>>>Little Orange Lily<<< is a valuable text, which will not only encourage bilingual children to do logopaedic exercises but also will guide them on how to find the way to integration with peers (...) and use their cultural distinctiveness as an asset” (Budzik, 2015). Magdalena Cebula emphasized the phonetic aspect: “The difference between the Polish hard and strong [r] and the French soft and voiced [ʁ] stems from different places of articulation (...) Exercises to help identify and pronounce correctly the two sounds are all the more important that [r] is one of the most difficult speech sounds (...) The situation becomes even more complicated in the case of children from bilingual families. Different production of this sound in the second language used by the child may lead to a mental block which will prevent the child from using this language. Phonetic stories, such as >>>Little Orange Lily<<< may be a great help” (Cebula; 2015). Weronia Król-Gierat pointed out that “The construction of the story, which enables the child to identify with the main character – a lily named Paulinka, who has petals of a different colour and lives in the world of two systems of communication – can be a wonderful tool to support the linguistic and affective development of children who are experiencing dilemmas of identity or adaptation difficulties” (Król-Gierat; 2015). Adam Krzyk noticed that “The publication (...) is a valuable text, especially in the Europe of today – still during the process of uniting, where multiculturalism (and the associated developmental difficulties which are an increasingly common research field for psycholinguists) should not be perceived as a distant phenomenon but as part of the reality around us” (Krzyk; 2015).

SUMMARY

Multilingualism and multiculturalism is a universal phenomenon. Such families need to pay close attention to the child's development and implement a coherent, compromise-based, and harmonious upbringing model. In addition, children from multilingual and multicultural families require special care from teachers, psychologists, and speech therapists in terms of emotional and linguistic development. A speech therapeutic story fully caters for the contemporary needs, as its universal concept can be transferred to different languages in order to motivate children to play and at the same time improve their speech and emotional self-control. A speech therapeutic story significantly improves the child's language communication and his well-being.

References

- D. Beltkiewicz. (2013). *A New Horizon in Logopaedics: Speech Therapeutic Story – Innovative Use of a Story in the Therapy of Children Speech Impediments*. In *Procedia – Social and Behavioral Sciences*, Vol. 106, pp. 149-163.
- Beltkiewicz, D. (2015). *Speech therapeutic story – a new method of support for the development of children from multilingual and multicultural families*. In *Biblioterapeuta*, Vol. 1 (70)/2015, Wrocław, pp. 39-43.
- Family In Pedagogika*, (2000). B. Milerski and B. Śliwowski (Eds.), Warsaw: Wydawnictwo Naukowe PWN, p. 192.

- Koźmińska, I., and E. Olszewska. (2007). *Discovering the world of values with the child*, Warsaw: Świat Książki.
- Sztompka, P. (2002). *Sociology. Analysis of the society*. Cracow: Wydawnictwo Znak.
- Molicka, M. (2011). *Bibliotherapy and therapeutic stories*. Poznań: Media Rodzina.
- Bełtkiewicz, D. (2014). *Attractive visual information as a factor which increases the effectiveness of a speech therapeutic story* In *Institutions, environments, and educational areas. Challenges and risks of the mid-XXI century*. M. Suświłło, N. A. Fechner (Eds.), Vol. 2., Poznań: Wydawnictwo Wyższej Szkoły Bezpieczeństwa, pp. 91-106.
- Bełtkiewicz, D. (2014). *Zima – przeszkoda u Wierzbki (Winter – Little Willow and its obstacle)* In Bystry Las, Drabina Rozwoju Foundation, www.aktywnelacza.com, The Aktywne Łączy Multimedia Expert System, www.aktywnelacza.com. Warsaw.
- Bełtkiewicz, D. (2013). *Rrromek i Rrradek (Rrromek and Rrradek)*, Warsaw: DoDo4Story Publishing House.
- Bełtkiewicz, D. (2015). *Pomarańczowa Lilijka (Little Orange Lily)* In *Biblioterapeuta*, Vol. 1 (70)/2015, Wrocław, pp. 43-48.
- Budzik, J. (2015). *Review* In *Biblioterapeuta*, Vol. 1 (70)/2015, Wrocław, p. 48.
- Cebula, M. (2015) *Review* In *Biblioterapeuta*, Vol. 1 (70)/2015, Wrocław, p. 49.
- Król-Gierat, W. (2015). *Review* In *Biblioterapeuta*, Vol. 1 (70)/2015, Wrocław, p. 49.
- Krzyk, A. (2015). *Review* In *Biblioterapeuta*, Vol. 1 (70)/2015, Wrocław, p. 49.
- All quotations and publication titles are the author's own translations.*

A Pedagogical Analysis Of Ahmed Adnan Saygun's İnci's Book

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ABSTRACT

This study aims to analyze of the work İnci's Book, composed by Turkish composer Ahmed Adnan Saygun for solo piano in 1934, with a pedagogical perspective. Firstly, to emphasize the importance of the study, the paper provides information about the developments in the field of music in the early years of the Republic of Turkey, first generation composers, called "The Turkish Five", including Ahmed Adnan Saygun, as well as Ahmed Adnan Saygun's life and works. The work, İnci's Book, is analyzed using the content analysis method. The findings obtained as a result of the analysis are expressed in frequencies and percentages. İnci's Book includes seven pieces. At the end of the study, it is found that the pieces which included in İnci's Book are appropriate for different levels of piano education.

Keywords: Ahmed Adnan Saygun, İnci's Book, piano pedagogy, pedagogical analysis, piano education, Turkish Five.

INTRODUCTION

Culture and education of the Republic of Turkey, founded in 1923, has been nationalistic. Educational reforms, having been developed towards this direction, were initiated by virtue of the Law on the Unification of Education (Tevhid-i Tedrisat), enacted in 1924. It was thanks to this law that the principles of secular education and teaching were unified, and the curriculums were prepared accordingly. Music lesson was included in the curriculums (Say, 2003). Musical education was proceeded to the Republican era with a limited, but also definite background, which had been maintained throughout the Ottoman Empire era. Not only the musical education in the Republican era was depended to this background, but it was further based on the respective thoughts and opinions of Mustafa Kemal Atat rk in particular (U an, 2005). While intending to found a state based on the concept of Turkish nation after the fall of the Ottoman Empire, Mustafa Kemal Atat rk further aimed to create the inventive art of the new state. As being the branch of art, which has affected the peoples in the fastest way throughout history, music was ranked the first among the reforms of Atat rk. It was prescribed to create a music, which was originated from Turkish folk music, but was also giving voice to a contemporary and universal language (İlyaso lu, 2007).

Atat rk's view on Turkish national music may be summarized as follows: "Turkish society is in a great, fast, and deeply-rooted change. Ottoman music is not inspiring enough to give voice to these great changes that Turkish Republic has been undergoing. The criterion for the change of a nation is to grasp, and comprehend the change in music. What we need is a new music. This music is to be a polyphonic music, originating from our folk music. It is essential to collect the grand phrases and pronunciations, which express the fine emotions and thoughts of the nation, as soon as possible, and to refine them according to the latest general music rules. It is only by this way that Turkish national music may be elevated, and claim its place in the universal music (U an, 2005). Institutionalism gained ground rapidly in parallel with the new cultural policies. Having Dar lelhan (House of Melodies) reopened in Istanbul in 1923 together with the western music department, Musiki Muallim Mektebi (School of Music Teachers) was opened in Ankara in 1924 in order to bring up music teachers for secondary education. Having Muzika-i H mayun (Royal Band) brought from Istanbul to Ankara in 1924, and was renamed as "Riyaset-i Cumhuriyet Musiki Heyeti" (presently known as Presidential Symphony Orchestra). Dar lelhan was turned into Conservatory in 1926, and started rendering western music education only thereafter (presently known as State Conservatory of Istanbul University). During this period, music ceased to be a mere means of joy, and advanced towards the domain of creativity based on free thinking (Say, 2003).

Youngsters were started to be sent to European countries in order to undergo music education as of the year 1924 by virtue of Atat rk's directive. After having been undergone music education in various European countries, Ekrem Zeki  n, Ulvi Cemal Erkin, Necil Kazım Akses, Hasan Ferid Alnar, and Ahmed Adnan Saygun returned to Turkey, and together with Cemal Re it Rey, having been undergone music education in Europe by different means, and returned back to Dar lelhan as music teacher in 1923, they altogether formed the first composer generation of the Republican era (Refi , 1997).

In 1926, teachers in Dar lelhan were sent to Anatolia, and did their parts of surveys, and having collected and arranged the folksongs, and turned them into a reference guide. During this period, Ministry of National Education started to send skillful music students to the musical centers abroad. In the year 1935, Paul Hindemith was invited to Ankara for the purpose of reorganizing not only the musical education institutions, but also the

musical life in Turkey as well. Thanks to his mediation, such experts, named Ernst Praetorius, Carl Ebert, and Eduard Zuckmayer also came to Ankara. Ankara State Conservatory was established in the year 1936. Bela Bartók came to Turkey in the same year, and he carried out ethno-musicological studies with Turkish composers namely as Ahmed Adnan Saygun, Ulvi Cemal Erkin, and Necil Kazım Akses (İlyasoğlu, 2007).

Turkish Five

The first generation in the Contemporary Turkish music, known as “Turkish Five” was composed of composers who had been listening to the traditional Turkish music during their childhood, then got to know polyphonic music by way of education, and all of whom applied the knowledge they had attained in the European countries they had been in their own works. Turkish Five is composed of Cemal Reşit Rey (1904–1985), Hasan Ferid Alnar (1906–1978), Ulvi Cemal Erkin (1906–1972), Ahmed Adnan Saygun (1907–1991), and Necil Kazım Akses (1908–1999). These composers contributed in all dimensions to the music art in the Republican Turkey to gain its identity in terms of global criteria. They served as educator, incorporator of musical institution, instrument master, and maestro. Turkish Five did not carry out collective studies under the roof of a certain institution. The common aim in their individual activities was to make compositions in the western form and technique based on the modal, melodic, and rhythmic structure of Turkish music (İlyasoğlu, 2007).

The element of folklore was adopted as a new dimension of music in the 20th century music. Colors and rhythmic texture of the folk music brought a new dimension in the new music (İlyasoğlu, 2007). Turkish folk melodies and the modal character of Turkish music, as well as its structure within *aksak* (halting) rhythms started to draw the attention of the musicians. Introductory studies of the first generation of Turkish composers involved the conversion of not only the melodies and rhythms of Turkish folk music in monophonic structure, but also the modal structure and mystic atmosphere of the classical Turkish music directly into polyphony, and attainment of a system getting closer to European music forms. Collection and notation of folk melodies, and their examination and assessment, too, altogether constituted a significant source (İlyasoğlu, 1989). While clearly conveying the traditional elements, the first generation of composers was under the influence of the musical movements from the foreign countries where they had been taught (İlyasoğlu, 2007).

First polyphonic works, having pursued Atatürk’s views with regard to national music, emerged mostly in the form of the polyphonic play of the folk melodies in the major composing techniques. Unique works were composed by way of applying folk melodies and the traditional elements of the modal music therein. Among these introductory works, in which French impressionist writing technique was used, may be listed as Cemal Reşit Rey’s “*On iki Anadolu Türküsü*” (1926) and “*Enstantaneler*” (1931), Ulvi Cemal Erkin’s “*Beş Damla*” (1931) ve “*Köçekçeler*” (1943), Ahmed Adnan Saygun’s “*İnci’nin Kitabı*” (1934), and Necil Kazım Akses’ “*Minyatürler*” (1936) (Tunçdemir, 2007).

Works of Contemporary Turkish Music, which have not only been derived from the values of traditional Turkish music, but also benefited from the accumulation of the international music, reveal the unique perceptions of their composers. The applicable sound system in this sort of works is not traditional, but of international validity; the structure is not monophonic, but polyphonic; sense of composition is not local-regional-denominational, but national and universal with its dimensions comprising those aforementioned. In these works, metrics, forms, and modal series of Turkish music have been applied in a contemporary perception (Sun, 2007).

Life of Ahmed Adnan Saygun

Ahmed Adnan Saygun received his first musical training in İzmir, studying privately with İsmail Zühtü. At 13 years old he became the piano student of Rosati. In 1922 he became a student of Macar Tevfik Bey, and in the meantime he studied harmony and counterpoint on his own. During the years 1924-1925 Saygun taught music in primary schools in İzmir and in 1926 he transferred to the Lycée of İzmir. Earning the scholarship of the Turkish Ministry of Education in 1928, he went to Paris to study music. In Scola Cantorum he studied harmony and counterpoint under Madame Eugène Borrel, organ music under Edouard Souberbielle and Gregorian chant under Amedée Gastoué. Returning home in 1931, Saygun was appointed to teach theory and counterpoint in the School for Music Instructors, in Ankara. In 1934 he conducted the Presidential orchestra for a year and beginning with 1936, for three years he taught theory at the Conservatory of İstanbul. In the same year, the celebrated Hungarian composer Bela Bartók visited Turkey and Saygun joined him in a tour of Anatolia. They collected many folk songs from Adana, and transferred them into conventional musical notation (İlyasoğlu, 2007).

In 1939 he was appointed inspector of the public culture centers, which were established during the early Republican era. As an inspector, Saygun traveled widely throughout Turkey, learning a great deal about the local rhythmical and melodic structure of the music of different districts. In 1940 he founded the Voice and String Union, where he organized the choral music of different epochs as well as Turkish compositions. In 1955 he

became one of the founders of the Folkloric Research Institute in Ankara. Between the years 1946-1972, Saygun taught composition at the Ankara State Conservatory. He also taught the structure of modal music and served as the head of department. Among his administrative positions we may note that he worked in the Ministry of Education as a member of the Administrative Board of TRT (1972-1978). Until his death he continued to teach ethnomusicology and composition at the Istanbul State Conservatory of Mimar Sinan University. In 1947 he was elected to the International Folk Music Council as an executive member. He was honored with the Palmes Academique Medal (France, 1949); Frederich Schiller Medal (Germany, 1955); Stella Della Solidarita (Italy, 1958); Jean Sibelius Composition Medal of the Harriet Cohen International Music Award (England, 1958); Bela Bartok Diploma (Hungary, 1981); Pro Cultura Hungarica Prize (Hungary, 1986). In 1948 he received the İnönü Award; in 1971 he was named a state Artist of Turkish Republic; in 1978 Ege University and Anadolu University gave him honorary doctorates; in 1981 he received the Atatürk Art Prize; in 1984 he was awarded the Grand Prize by the Ministry of Culture and Art; he was honored by the Osman Hamdi Award of Mimar Sinan University on its centennial anniversary, and Sevda Cenap And Foundation's Gold Honor Medal of 1990 (İlyasoğlu, 2007).

Works of Ahmed Adnan Saygun

Saygun did a great deal of research in the field of ethnomusicology and his studies on pre-modal and modal music have illuminated polyphonic compositions in Turkey. He carried out studies comparing traditional Turkish modes with other modal music such as Persian and Greek. His compositions are in a modal structure. He has carried out research into Anatolian folk music, Asian songs, and songs from Urals, as well as Hungarian and Finnish folk songs, examining their pentatonic structure and other musical characteristics (İlyasoğlu, 2007).

One of his main principles was taken from Atatürk's aim of achieving an international outlook in music, which is at the same time national. He believed that art may develop without breaking away from its roots. He wrote two operas in 1934, the first examples of polyphonic opera in Turkey. His later vocal works reflect the tribulations of those in search of truth. He was very much concerned with the correct usage of the Turkish language in all of his vocal works. He was inspired by folk tales as much as folk songs. He used Islamic hymns and also themes from epics. His conception of modal harmonization influenced the technique of the following generations (İlyasoğlu, 2007).

The copyright of some of his works is held by SACEM, while some of them belong to Southern Music Publishing Co., New York and some to Peer Musikverlag, Hamburg. His works are preserved by Bilkent University (İlyasoğlu, 2007).

Piano Works of Ahmed Adnan Saygun

The works having been composed by Ahmed Adnan Saygun for the piano are listed chronologically as follows (İlyasoğlu, 2007):

- Op. 2 Suite (1931)
- Op. 10/a İnci's Book (1934)
- Op. 15 Sonatina (1938)
- Op. 25 From Anatolia (1945)
- Op. 42 Small Pieces (1950-1952)
- Op. 38 Ten Etudes on Aksak Rhythms (1964)
- Op. 45 Twelve Preludes on Aksak Rhythms (1967)
- Op. 47 Fifteen Pieces on Aksak Rhythms (1971)
- Op. 58 Ten Sketches on Aksak Rhythms (1976)
- Op. 56 Ballade (for two pianos) (1975)
- Op. 73 Poem (for three pianos) (1986)
- Op. 76 Piano Sonata (1990)

İnci's Book

İnci's Book composed in 1934 for Saygun's friend Prof. Veli Saltık's daughter who is named "İnci". The composer dedicated the work to his teacher Madame Eugène Borrel. The work includes seven pieces: (1) İnci, (2) Afacan Kedi (Playful Kitten), (3) Masal (A Tale), (4) Kocaman Bebek (The Giant Doll), (5) Oyun (A Joke), (6) Ninni (Lullaby), (7) Rüya (A Dream). İnci's Book describes various images in the life of a child from her/his eyes such as Debussy's *Children's Corner*. The work recalls Bartok's *For Children* and *Mikrokosmos* because of consists easy pieces for children. *Piano Quarterly Newsletter* (1953) chose İnci's Book as one of the top works published for young pianists. *Notes* (1952) mentioned that this work has high musicality and appropriate for

children (Aracı, 2007). İnci's Book has been published by the "Jorj. D. Papajorjiu" in İstanbul, "Southern Music Publishing Co. Inc." in the United States of America (1952) and "Müzik Eğitimi" in Ankara (2011).

İnci's Book is a modal work which includes pentatonic scale and Baroque composing techniques (diminution, imitation, inversion). Pedagogical factors affected to compose of the work. Saygun composed most of the pieces in two parts. Left hand parts are written in treble clef at three pieces of the work (1, 2, and 3). Each piece takes between half a minute and two minutes. Also each piece has attractive titles (Aracı, 2007). İnci's Book is appropriate for first and second grades of piano education according to Gökbudak's (2013) eight graded approach. At the same time it is appropriate for third and fourth grades of piano education according to Pamir's (1987) eleven graded approach. According to *The Piano Teachers' Newsletter* (Eastern New Mexico University, 1956; Aracı, 2007) difficulty of the work is as follows: (1) Early Advanced, (2) Intermediate, (3) Late intermediate, (4) Intermediate, (5) Intermediate, (6) Easy, (7) Early Intermediate. Ninni (Lullaby) is among the most frequently performed works in the music departments in Turkey (Aydiner, 2008).

In the first piece, *İnci*, the piano student practices to play right hand melody over a left hand formed of successive eighth notes. In *Playful Kitten*, the student studies finger turns. In the slow and mysterious third piece, *Tale*, the use of symmetrical and asymmetrical metric structures along with more complicated rhythmic patterns is introduced to the student. *The Giant Doll* begins with both hands playing the same melody and is good for synchronization of both hands. It also introduces use of a larger range in the left hand. In *A Joke*, frequent meter changes between duple, triple and quadruple meters and use of moving melodic lines in both right and left hands are noteworthy. In *Lullaby*, the left hand part is beneficial for working on finger turns and octave stretches. *Dream* also provides a good left hand exercise with its broken chords larger than an octave. In *İnci's Book*, Turkish folkloric elements are not as noticeable as in the previously discussed compositions, but, A. A. Saygun uses pentatonic scales which are strongly rooted in Turkish folk songs, thus giving a different flavor to each composition. With their different but appealing sound, these short pieces are certainly good additions to the repertory of the younger pianist (Serdaroğlu, 2011).

METHOD

Ahmed Adnan Saygun's work named *İnci's Book* comprises the target population of this study. This work is consisted of seven pieces. Content analysis was made in this study, in which general screening model was applied. Categorical type of content analysis was preferred as being suitable to the purpose of this study. Categorical analysis in general means to be the division of a specific message into units at first, and having these units grouped in categories in accordance with predetermined criteria thereafter. In the categorical analysis, frequency of the categories is determined. The intensity and significance of a specific element may thereby be understood (Tavşancıl & Aslan, 2001). In accordance with the purpose of this study, Ahmed Adnan Saygun's work named *İnci's Book* is analyzed by way of splitting it into eight categories, namely as *technique, meter, note value, tempo, harmonic/polyphonic structure, dynamic, character, difficulty level*.

FINDINGS

In this section, Ahmed Adnan Saygun's work named *İnci's Book* is analyzed by way of splitting it into eight categories, namely as *technique, meter, note value, tempo, harmonic/polyphonic structure, dynamic, character, difficulty level*. The data regarding these categories were sorted out in consideration of the features being possessed by each and every song contained in the respective work, and presented in tables. The attained data were assessed in view of piano pedagogy.

Table 1: Analysis of the Playing and Pedal Techniques in Ahmed Adnan Saygun's work named *İnci's Book*

TECHNIQUE		THE PIECES CONTAINING THEM	f	%
Playing Technique	Legato	1, 2, 3, 4, 5, 6, 7	7	100
	Broken Chord	7	1	14
Pedal Technique	Damper pedal	7	1	14

Reviewing the table with regard to the techniques in the work named *İnci's Book*, the pieces within the work involve *legato* technique by 100%. In view of the table with regard to the other techniques involved in the work named *İnci's Book*, the pieces within the said work involve *broken chord* by 14%, *damper pedal* by 14%. It may thereby be said that, this work may to a large extent be effective on bringing in the *legato* technique in the piano education.

Table 2: Analysis of the Meters in Ahmed Adnan Saygun's work named *İnci's Book*

METER			THE PIECES CONTAINING THEM	f	%
TIME SIGNATURES	Simple Meter	2/4	4, 5	2	28
		3/4	3, 5, 7	3	43
		4/4	1, 5, 6, 7	4	57
		2/2	2	1	14
	Aksak Meter	5/8	3	1	14
	Metric Change		3 (3/4→5/8→3/4→5/8) 5 (3/4→4/4→3/4→4/4→ 3/4→2/4→3/4→4/4) 7 (4/4→3/4→4/4)	3	43

In view of the table with regard to the number of meters consisted in the work named *İnci's Book*, the pieces within the work seem to involve the following number of meters: 2/4 by 28%, 3/4 by 43%, 4/4 by 57%, 2/2 by 14% and 5/8 by 14%. Metric change by 43% is also seen in Table 2; while the same change proceeds in the form of 3/4→5/8→3/4→5/8 in the Piece#3, in the form of 3/4→4/4→3/4→4/4→3/4→2/4→3/4→4/4 in the Piece#5 and the same proceeds in the form of 4/4→3/4→4/4 in the Piece#7. It may further be said according to this table that, the pieces within the work named *İnci's Book* are written in numbers of simple meters different from each other, 4/4 is the most frequent meter in the work and also may be beneficial particularly in the introduction of aksak meters (5/8) in the piano education.

Table 3: Analysis of the Note Values in Ahmed Adnan Saygun's work named *İnci's Book*

NOTE VALUE	THE PIECES CONTAINING THEM	f	%
semibreve	1, 2, 5, 7	4	57
minim	1, 2, 3, 4, 5, 6, 7	7	100
crotchet	1, 2, 3, 4, 5, 6, 7	7	100
quaver	1, 2, 4, 5, 6, 7	6	86
semiquaver	3, 4, 7	3	43
dotted minim	7	1	14
dotted crotchet	3, 4, 5, 6, 7	5	71
dotted crotchet	3, 4, 7	3	43

In view of the table with regard to the note values consisted in the work named *İnci's Book*, the pieces within the work seem to involve the following note values: *minim* by 100%, *crotchet* by 100%, *quaver* by 86%, *dotted crotchet* by 71%, *semibreve* 57%, *semiquaver* 43%, *dotted crotchet* 43% and *dotted minim* by 14%. It may thereby be said that, the most frequently used note values are *minim*, *crotchet*, *quaver* and *dotted crotchet* in this work.

Table 4: Analysis of the Tempo in Ahmed Adnan Saygun's work named *İnci's Book*

TEMPO (according to the metronome markings)		THE PIECES CONTAINING THEM	f	%
Speed	Slow	3, 6, 7	3	43
	Moderately	1	1	14
	Fast	2, 4, 5	3	43
Change of tempo	Ritardando	1, 4, 7	3	43
	Rallentando	3	1	14

In view of the table with regard to the tempo (according to the metronome markings) and changes in tempo involved in the work named *İnci's Book*, the pieces within the said work involve the slow tempo by 43%, moderately tempo by 14%, fast tempo by 43%, while they involve tempo changes of by *ritardando* 43%, *rallentando* by 14%.

Table 5: Analysis of the Harmonic and Polyphonic Structures in Ahmed Adnan Saygun's work named *İnci's Book*

HARMONIC/POLYPHONIC STRUCTURE	THE PIECES CONTAINING THEM	f	%
Modal	1, 2, 3, 4, 5, 6, 7	7	100
Homophonic	1, 3, 4, 7	4	57
Polyphonic	2, 5, 6	3	43

In view of the table with regard to the harmonic and polyphonic structures involved in the work named *İnci's Book*, the pieces within the said work seem to be of *modal* structure by 100%, and of *homophonic structure* by 57%, and *polyphonic structure* by 43% as well. When they are used in the contemporary music according to the sound system of equal intervals, the modes being accepted as original modes are named as artificial modes generated from the original (Yöre, 2012). Accordingly the harmonic structure of the work named *İnci's Book* written for the piano is characterized as modal.

Table 6: Analysis of the Dynamics in Ahmed Adnan Saygun's work named *İnci's Book*

DYNAMIC	THE PIECES CONTAINING THEM	f	%
Piano pianissimo	3	1	14
Pianissimo	1, 3, 4, 6, 7	5	71
Piano	1, 2, 3, 4, 6, 7	6	86
Mezzoforte	7	1	14
Forte	2, 4, 7	3	43
Fortissimo	4	1	14
Crescendo	2, 3, 7	3	43
Decrescendo	3, 7	2	28
Diminuendo	3	1	14
Accent	4, 7	2	28

Reviewing the table with regard to the dynamic, in the work named *İnci's Book*, the pieces within the work are seemed to involve *piano* by 86%, *pianissimo* 71%, *forte* by 43%, *crescendo* 43%, *decrescendo* 28%, *accent* 28%, *piano pianissimo* by 14%, *mezzoforte* 43%, *fortissimo* by 14%, *diminuendo* by 14%. In view of this table, in which the dynamics appertained to the work named *İnci's Book* seem to involve a wide range from *piano pianissimo* to *fortissimo*, it may be said that, this work may be helpful in order to bring the dynamics in the piano education.

Table 7: Analysis of the Characters in Ahmed Adnan Saygun's work named *İnci's Book*

CHARACTER	THE PIECES CONTAINING THEM	f	%
Calme	1, 7	2	28
Giocoso	2	1	14
Misterioso	3	1	14
Animato	4, 5	2	28
Tranquillo	6	1	14

Reviewing the table with regard to the character, in the work named *İnci's Book*, the pieces within the work are seemed to involve *calme* by 28%, *animato* 28%, *giocoso* by 14%, *misterioso* 14%, *tranquillo* 28%. In view of this table, it may be said that, this work may be helpful in order to bring the various musical characters in the piano education.

Table 8: Analysis of the Difficulty Levels in Ahmed Adnan Saygun's work named *İnci's Book*

DIFFICULTY LEVEL	THE PIECES CONTAINING THEM	f	%
Easy	5, 6	2	28
Moderate	1, 2, 3, 4, 7	5	71
Difficult	-	-	-

Reviewing the table with regard to the difficulty level, in the work named *İnci's Book*, the pieces within the work are seemed to beginner level by 28% and intermediate level 71%. In view of this table, it may be said that, the pieces which included in *İnci's Book* are appropriate for beginner and intermediate levels of piano education.

CONCLUSION

Ahmed Adnan Saygun's work named *İnci's Book* is pedagogically analyzed by way of splitting it into eight categories, namely as *technique*, *meter*, *note value*, *tempo*, *harmonic/polyphonic structure*, *dynamic*, *character*, *difficulty level*. The following conclusions have been attained from the aforementioned analyses: *İnci's Book* may to a large extent be effective on bringing in the legato technique in the piano education. The pieces within the work named *İnci's Book* are written in numbers of simple meters different from each other. The most frequently used note values are minim, crotchet, quaver and dotted crotchet in this work. *İnci's Book* is a modal structured work. The work is helpful in order to bring the various dynamics and various musical characters in the piano education. It is found that the pieces which included in *İnci's Book* are appropriate for different levels of piano education.

References

- Aracı, E. (2007). *Ahmed Adnan Saygun: Doğu-batı arası müzik köprüsü (2nd ed.)*. İstanbul: Yapı Kredi.
- Aydiner, M. (2008). Piyano eğitiminde en sık seslendirilen Türk eserlerinin müziksel öğelerinin analizleri. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 8(2), 125-140.
- Gökbudak, Z. S. (2013). Piyano eğitiminde öğretim eserleri ve basamakları. In S. Karakelle (Ed.), *Piyano öğretiminde pedagojik yaklaşımlar* (1-42). Ankara: PegemAkademi.
- İlyasoğlu, E. (1989). *Yirmibeş Türk bestecisi/Twentyfive Turkish composers*. İstanbul: Pan.
- İlyasoğlu, E. (2007). *71 Türk bestecisi/71 Turkish composers*. İstanbul: Pan.
- Pamir, L. (1987). *Çağdaş piyano eğitimi*. İstanbul: Beyaz Köşk.
- Refiğ, G. (1997). *Atatürk ve Adnan Saygun: Özsoy operası*. İstanbul: Boyut.
- Say, A. (2003). *Müzik tarihi*. Ankara: Müzik Ansiklopedisi.
- Serdaroğlu, E. (2011). Enriching the repertory of younger pianist: A study of solo piano compositions of Turkish composers from Intermediate to early advanced level. *Encontros de Investigação em Performance, Universidade de Aveiro*.
- Sun, M. (2007). *Türk müziği makam dizileri: Piyano için*. Sun: Ankara.
- Tavşancıl, E., & Aslan, A. E. (2001). *İçerik analizi ve uygulama örnekleri*. İstanbul: Epsilon.
- Tunçdemir, İ. (2007). Cumhuriyet dönemi müzik kültürünün oluşmasında rol oynayan sanatçılarımız ve Türk müziğine katkıları. 16. Ulusal Eğitim Bilimleri Kongresi, Gaziosmanpaşa Üniversitesi, Tokat, Türkiye, 5-7 Eylül 2007.
- Uçan, A. (2005). *Müzik eğitimi: Temel kavramlar-ilkeler-yaklaşımlar ve Türkiye'deki durum* (3.baskı). Ankara: Evrensel Müzik.
- Yöre, S. (2012). *Temel besteleme malzemeleriyle çağdaş müzik*. İstanbul: Bağlam.

Analyses Of Distance Education Performance Based On Quantile Regression Method

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ABSTRACT

The method of student observation, which is common in conventional education, may not be possible in distance education. In this study we propose a method to solve this problem. In distance education the data regarding the monitoring of student performance is stored in the logs of education management system. Logs include information such as how much time the student studied the instructional materials, how long he/she was active in the system, the student's success and failure percentages in quizzes, how active the student was in forums opened on various subjects, and how many messages the student wrote and read on those forums. Logs can be analyzed and the student's performance can be predicted before the final exam. Such information can provide the institution and the instructors with many benefits. If this prediction is done in the middle of the academic year it can help to take early measures in prevention of unintended consequences, especially in at-risk students. The objective of this study was to predict the student's academic performance weeks before the end of the semester and to provide the instructors, teaching institutions and content providers with contributions related to the improvements and updates. The students' six-week logs were used in the study. The most important factor that separates our study, which used a hybrid of fuzzy logic and clustering methods, from other studies was that we applied quantile regression method along with least squares method in determining the parameters and compared the results. The quantile regression method makes it possible to use even the data contrary to the generated prediction model, thus, improving the model's prediction performance. This distance education performance analysis approach based on the quantile regression was tested in Basic Computer Science courses and successful results were obtained.

INTRODUCTION

In computer-aided learning environment, the student behavior is an issue that needs to be addressed. In the traditional learning environment, such as a classroom, teachers can monitor student behavior during the class. The observation of student behavior can help to determine the students' needs. Moreover, these observations are utilized in the regulation of the educational environment, and determining the course content and teaching methods. The observation of student behavior is also a method used in student assessment and evaluation. Various methods are needed to evaluate the student behavior in distance education. Web-based learning environment makes it difficult for teachers to evaluate students' behavior. Teachers cannot observe students while they are working. In distance education the information regarding the student behavior is stored in the data file as computer records and based on this data analyses is required when student behavior needs to be interpreted (Ciftci, 2003).

Distance education is usually given in the learning management system (LMS) environment. Very large amounts of data are stored in this environment. Students' every movement in the LMS environment is monitored and maintained in the database as log records. Valuable information can be obtained through the analysis of these data (Zafra & Ventura, 2009).

Prediction of the student's performance provides many benefits for instructors and teaching institutions. Moreover, predicting the students' performance at the beginning of the academic year can also help to take early measures to prevent poor results in the future for at-risk students.

In this study, we used 8-week LMS data of students involved in distance education and designed a hybrid model to predict end of the year student academic performance. This hybrid model is composed of fuzzy logic and clustering methods (Yildiz, Bal & Gulsecen, 2015). Yildiz et al. have used the least squares method for finding the parameters that fit the criteria. On the other hand, in this study, we used the quantile method, which is more sensitive to outliers in estimation of parameters and enabled us to compare the obtained results.

THE STUDY

Two methods were used to estimate parameters in this application: the least squares method and the quantile regression method. Since the least squares method is affected by outlier data, outlier analysis should be performed on the data sets prior to the cluster analysis, and whether the data fits the normal distribution should be tested. Raw data cannot be directly used in cluster analysis and therefore the data should be normalized or standardized by using some converter tools (Gan, Ma, & Wu, 2007). On the other hand, outliers rarely affect the quantile method and in this study the results were obtained from all data without the need for outlier analysis.

The Mahalanobis Distance, Cook's Distance and Leverage point methods were used for outlier data analysis (Kogar, 2010; Vural, 2007; Gumus, 2013). The SPSS 17 software package is used for implementation of these methods. First, the outlier analysis was done on 2011-2012 academic year training and test results of 218 students. Later, the same analysis was performed on 2012-2013 data of 95 students that took the same course. Among the outliers determined by aforementioned methods 15 parameters were excluded from training and 10 parameters were excluded from validation. After removing the outliers a total of 218 training parameters and 203 test parameters left in the study. Likewise, after the outliers were removed, 85 validation parameters have remained.

Estimating Parameters by the Least Squares Method in Takagi-Sugeno Type Fuzzy Inference System

Rules for Takagi-Sugeno-type fuzzy logic system is shown in equation 1

$$y^i = a_0^i + a_1^i x_1 + \dots + a_k^i x_k \quad (1)$$

The coefficients in the rule are found using the least squares method. Steps in finding these parameters in fuzzy logic system are shown below.

For each x_i entry

$$f(x_1) = \beta_1(a_0^1 + a_1^1 x_{11} + \dots + a_k^1 x_{k1}) + \beta_2(a_0^2 + a_1^2 x_{12} + \dots + a_k^2 x_{k2}) + \dots + \beta_n(a_0^n + a_1^n x_{1n} + \dots + a_k^n x_{kn})$$

In the equation above m is defined as

$$\beta_m = \frac{\mu_m(x_0)}{\sum M x_m} \quad (2)$$

$$\sum M x_m = \sum_{j=1}^n \mu_{jm}(x_0) \quad (3)$$

When the same procedure is done for all rules

$$\begin{aligned} f_1(x_1) &= \beta_{11}(a_0^1 + a_1^1 x_{11} + \dots + a_k^1 x_{k1}) + \beta_{21}(a_0^2 + a_1^2 x_{12} + \dots + a_k^2 x_{k2}) + \dots + \beta_{n1}(a_0^n + a_1^n x_{1n} + \dots + a_k^n x_{kn}) \\ f_2(x_1) &= \beta_{12}(a_0^1 + a_1^1 x_{11} + \dots + a_k^1 x_{k1}) + \beta_{22}(a_0^2 + a_1^2 x_{12} + \dots + a_k^2 x_{k2}) + \dots + \beta_{n2}(a_0^n + a_1^n x_{1n} + \dots + a_k^n x_{kn}) \\ &\vdots \\ f_w(x_1) &= \beta_{1w}(a_0^1 + a_1^1 x_{11} + \dots + a_k^1 x_{k1}) + \beta_{2w}(a_0^2 + a_1^2 x_{12} + \dots + a_k^2 x_{k2}) + \dots + \beta_{nw}(a_0^n + a_1^n x_{1n} + \dots + a_k^n x_{kn}) \end{aligned}$$

$$\begin{bmatrix} f_1 \\ \vdots \\ f_n \end{bmatrix} = \begin{bmatrix} \beta_{11}\mu_{11} & \beta_{11}\mu_{12} & \dots & \beta_{11}\mu_{n1} & \beta_{11} & \dots & \beta_{m1}\mu_{11} & \beta_{m1}\mu_{12} & \dots & \beta_{m1}\mu_{n1} & \beta_{m1} \\ \vdots & \vdots & & \vdots & \vdots & \ddots & \vdots & \vdots & & \vdots & \vdots \\ \beta_{1w}\mu_{11} & \beta_{1w}\mu_{12} & \dots & \beta_{1w}\mu_{n1} & \beta_{1w} & \dots & \beta_{mw}\mu_{11} & \beta_{mw}\mu_{12} & \dots & \beta_{mw}\mu_{n1} & \beta_{mw} \end{bmatrix} \begin{bmatrix} a_0^1 \\ a_1^1 \\ \vdots \\ a_n^1 \\ \vdots \\ a_0^m \\ a_1^m \\ \vdots \\ a_n^m \end{bmatrix} \quad (4)$$

Here, in β_{ik} parameter i is factor and k is set center and for x_k

$$\beta_{ik} = \frac{\mu_{ik}(x_0)}{\sum Mx_{ik}} \quad (5)$$

$$\sum Mx_{ik} = \sum_{i=1}^w \mu_i(x_0) \quad (6)$$

If we define the above matrix multiplication as $B=AX$, A matrix describes fixed numbers, B matrix describes outputs and X matrix shows parameter values to be estimated. The least squares method is used to solve this problem (Ren, 2006).

$$X = (A^T A)^{-1} A^T B \quad (7)$$

After the parameters are found by using the least squares method equations for the rules are generated.

Estimating Parameters by the Quantile Method in Takagi-Sugeno Type Fuzzy Inference System

Alma and Vupa compared the efficiencies of least squares method and other different methods in parameter estimation of regression equations. It has been determined that when there are multiple outliers in the data, these values may mask each other and may cause reliable data to be seen as outlier data (Alma and Vupa, 2008). Therefore, it is stated that in the regression model for small samples the least squares method is affected more than other methods when the error terms are not normally distributed or when dependent variables include outlier data. In our study we used the quantile method, which is not affected by the presence of outlier data, as an alternative method when estimating parameters.

When observation values of this series are sorted from small to large, the total frequency of the series were divided into two, four, ten or a hundred equal parts that are generally defined as quantile (Keskin,2012). In the classical linear regression, regression curve passes through the middle of the observation point or center of gravity. Meanwhile the quantile regression curves pass through the quantile. The path of the quantile regression curve can be determined as asymmetric. For example, when the quantile value is determined as 0.10 it means that 10% of observations are under the quantile regression curve. Thus, a more detailed view of the cumulative distribution of the data can be obtained. So, when the quantile value is 0.10 the vast majority of the points will pass above the quantile regression curves. There are important reasons for using quantile instead of averages in quantile regression. These reasons are listed as follows:

- Provides the ability to analyze any point in the distribution.
- Provides robust estimates.
- More useful in the analysis of outlier data.
- The right approach when interested in representative values.
- Must be used when dealing with the tail of distribution.
- Provides the ability to analyze the effects of estimator variables in terms of both the location and scale parameters.
- Has a semi-parametric approach that avoids assumptions about the parametric distribution of the error terms. This enables the use of quantile regression in varying variance samples.

Quantile regression equation is expressed as in equation 8

$$Y_i = X_i' \beta(\tau) + u_i(\tau) \quad (8)$$

$$Q_\tau(Y_i|X_i) = X_i' \beta(\tau) \quad (9)$$

Here;

Y_i : Dependent variable;

X_i : Independent variable;

$u_i(\tau)$: Error terms;

$\beta(\tau)$: Parameter vector changing with zones;

$\tau \in (0,1)$: Analyzed zone;

$Q_\tau(\cdot)$: Y_i Zone function defined as inverse function of the cumulative conditional distribution function $F(\cdot)$.

Estimation of parameters requires the solution of the following minimization problem.

$$\text{Min}_{\beta \in \mathbb{R}^k} [\sum_{i \in \{i: Y_i < X_i \beta\}} \tau |Y_i - X_i \beta| + \sum_{i \in \{i: Y_i \geq X_i \beta\}} (1 - \tau) |Y_i - X_i \beta|] \quad (10)$$

Y_i 's conditional zone τ is $Q_\tau(Y_i|X_i) = X_i' \beta(\tau)$, and its estimation is derived by $\widehat{Q}_\tau(Y_i|X_i) = X_i' \widehat{\beta}(\tau)$. In the equation 10, $\tau = \frac{1}{2}$ gives the median regression of equally weighted error data. The zone regression parameter for independent J variable can be calculated by using equation 11 (Colak, Ozturkler and Tokatlioglu, 2008):

$$\frac{\partial Q_\tau(Y_i|X_i)}{\partial x_{ij}} = \beta_j \quad (11)$$

FINDINGS

The accuracy percentages of training and test data determined by using all available methods are given in the table 1. The comparisons were done based on least squares and quantile method without performing outlier analysis. In determining academic performance clustering methods such as k-means clustering method (KMCM), fuzzy c-means clustering method (FCCM) and subtractive clustering method (SCM) were used to generate Takagi-Sugeno Type Fuzzy Logic model.

Table 1: The accuracy rate of academic performance based on numerical prediction.

Data type	Least Squares Method			Quantile Method		
	KMCM	FCMCM	SCM	KMCM	FCMCM	SCM
Training	0.90	0.91	0.90	0.90	0.90	0.90
Test	0.87	0.87	0.85	0.87	0.85	0.84
Validation	0.71	0.62	0.75	0.69	0.76	0.77
Mean	0.83	0.80	0.83	0.82	0.84	0.84

When the results were evaluated we found that the accuracy rates for numeric estimation of academic performance has been shown to be better in the quantile method. The accuracy rates based on students that were classified categorically as passed or failed are given in Table 2.

Table 2: The accuracy rates based on “passed”-“failed” academic performance

Data type	Least Squares Method			Quantile Method		
	KMCM	FCMCM	SCM	KMCM	FCMCM	SCM
Training	0.90	0.91	0.91	0.92	0.90	0.93
Test	0.84	0.84	0.79	0.83	0.86	0.78
Validation	0.94	0.93	0.95	0.96	0.95	0.95
Mean	0.89	0.89	0.88	0.90	0.90	0.89

When the students' academic performance was predicted categorically based on least squares and quantile method, the accuracy rate results were found to be better with the quantile method.

CONCLUSIONS

The rapid development of technology not only creates new areas that did not exist before, but also provides positive contributions to advancements of existing fields. One of these areas is undoubtedly the education/training. With the advancement of technology the traditional education has gained a tendency to move towards distance education and the acceleration of this tendency is increasing with each passing day. However, along with the advantages of distance learning there are also some disadvantages. One of those disadvantages is that in distance education the student performance cannot be observed as in traditional education. In this study, we generated mathematical observational models to measure student performance by using logs kept in learning management system (LMS). We believe that this study will make significant contributions to science education and especially to educators and administrations in distance education.

In the application to determine the parameters by using least squares method first the data was analyzed by outlier analysis then various converter tools were used to provide the normal distribution of the data. Clustering methods such as k-means, fuzzy c-means and subtractive clustering method were used for clustering. The model consisted of three different types of data including training data, test data and validation data. The highest mean accuracy rate (87.7%) was found with fuzzy c-means clustering method. This means that there was about 12% margin of error in numerically estimating the end of the year academic performance of students in distance education. An 8-week data was used to make this prediction. Along with numerical estimation a categorical prediction of "pass" or "fail" was performed. The best result (92.28%) was determined with subtraction clustering method.

In quantile method the data was analyzed without prior outlier analyses and then was compared to results obtained by using least squares method also performed without outlier analysis. The numerical prediction of academic performance of distance education students determined by quantile method was 1-4% higher on average. Meanwhile, in categorical estimations this ratio was approximately 1% higher. Overall, the rate of errors in estimations performed with outlier analyses is lower than estimations performed without outlier analyses.

This study was conducted based on the data of students enrolled in Basic Computer Science online courses. In the future, relevant data can be collected with different courses and results can be compared. In this study, the demographic characteristics of the students were not included in the model. In future studies, the model can be generated including those characteristics and the results can be compared with current results. In addition, in future studies methods other than quantile method can be used as an alternative to the least squares method in estimation of the parameters used in the fuzzy model rules and therefore improve the results even more.

References

- Çiftçi, S., 2006, *The Investigation of Students' Activities in Distance Education by Analyzing Log Data*, Master Thesis, Institute of Education Sciences, Gazi University.
- Zafra, A., Ventura, S., 2009, Predicting Student Grades in Learning Management Systems with Multiple Instance Genetic Programming, *Educational Data Mining*, pp. 307-314.
- Yıldız, O., Bal, A., Gülseçen, S., 2015, Statistical and Clustering Based Rules Extraction Approaches for Fuzzy Model to Estimate Academic Performance in Distance Education, *The EURASIA Journal of Mathematics, Science & Technology Education*, 11(2), 391-404.
- Koğar, H., 2010, *The Effects of Endpoint Adjustment Methods in Different Sampling Sizes on Validity and Reliability Proofs of Values*, Master Thesis, Institute of Science and Technology, Ankara University.
- Vural, A., 2007, *The Effects of the Outliers on Regression Models and Robust Estimators*, Master Thesis, Institute of Social Sciences, Marmara University.
- Gan, G., Ma, C., Wu, J., 2007, *Data Clustering*, American Statistical Association and The Society for Industrial and Applied Mathematics, Alexandria.
- Gümüş, E., 2013, *The Investigation of Stability of Smallest Covariance Determinant Based Test Statistics Used for Multivariate Outlier Detection in terms of Type I Error*, Master Thesis, Institute of Science and Technology, Gazi University.
- Ren, Q., 2006, *Type-2 Takagi-Sugeno-Kang Fuzzy Logic Modeling Using Subtractive Clustering*, Thesis (Ph.d), University of Montreal.
- Alma, Ö., Vupa, Ö., 2008, *The Comparison of Least Squares and Least Median Squares Methods Used in Regression Analysis*, Suleyman Demirel University Faculty of Arts and Science Journal (E-Journal) 3 (2), 219-229.
- Altındağ, İ., 2010, *Quantile Regression and An Application*, Masters Thesis, Institute of Science and Technology, Selçuk University.
- Keskin, B., 2012, *A Stable Inference Method: Quantile Regression*, Master Thesis, Institute of Science and Technology Muğla Sıtkı Koçman University.
- Çolak, Ö. F., Öztürkler, H., Tokatlıoğlu, İ., 2008, The Estimation of Turkey's Consumption Function by Quantile Regression Method, *İktisat İşletme Finans*, 23(268), 63-93.

Anecdote-Spin-Instructional-Design

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ABSTRACT

Instructional Design is a wonderful tool in the hands of any Instructor, be a class teacher or a lecturer, or a professor. Having an Instructional design and knowing how to use it will make one an effective instructor (Bandura 1997). The design could be in the form of a method or a paradigm, or any cognitive frame work (Elliot and McGregor 2001; Cury et al., 2006). Each design could have its own logic, for example Clarke, Ayres, and Sweller (2005) used spreadsheet application as instructional design to teach students mathematical concepts and procedures (Ambrose et al., 2010). Here we propose a design namely *Anecdote-Spin-Instructional-Design*. People of every age, be it young or old or middle aged, all like to hear amusing stories or interesting facts and figures or enumeration of real incidents or narration of an anecdote (Stevens and Levi 2005). Sprouting to be a very handy Instructional Design shortly.

Keywords: Instructional Design, Education, Participatory learning, Classroom Management, Techniques of Teaching, Story-telling.

INTRODUCTION

Instructional Design is a wonderful tool in the hands of any Instructor, be a class teacher or a lecturer, or a professor. Having an Instructional design and knowing how to use it will make one an effective instructor (Bandura 1997). The design could be in the form of a method or a paradigm, or any cognitive frame work (Elliot and McGregor 2001; Cury et al., 2006). Keeping in mind that the Instructional design that one uses should be a triple 'p', practical, productive, and progressive. The instructional design that one handles should have a developmental space, a *sleuth*, or opportunities for progression within the designed-system, (Carter et al., 2007). "Research has shown that good problem solvers will try new strategies if their current strategy is not working", (National Research Council 2001, p.78). The Instructional Design should help the Instructor to drive home the *Instructional Content* effectively. "...the magic of metaphor to inform, educate, teach values, discipline, build experience, facilitate problem solving, change, and heal" (Burns 2005).

Anecdote-Spin-Instructional-Design.

The paradigm of the instructional design could be of various kinds and forms. Each design could have its own logic, for example Clarke, Ayres, and Sweller (2005) used spreadsheet application as instructional design to teach students mathematical concepts and procedures (Ambrose et al., 2010). Here we propose a design namely *Anecdote-Spin-Instructional-Design*. People of every age, be it young or old or middle aged, all like to hear amusing stories (Burns 2005), or interesting facts and figures or enumeration of real incidents or narration of an anecdote (Stevens and Levi 2005). Hence it's a very catchy type of a tool as an instructional design.

The application of the *Anecdote-Spin-Instructional-Design* is very simple and also has provision for multiple options. This instructional design is primarily for the schools, colleges and university students, structured in a pattern of 3 Modules. Each Module is complete in itself and could be used in different context. One can also use the entire design of 3 Modules for one full session. For example, if the instructor addresses a group of lower level school students the Module-I is sufficient to get across the message. If the instructor is addressing the higher level school students or college students the instructor could start off with the Module-II directly, or even start with the Module-I and proceed to the Module-II and conclude there. If the instructor is addressing the college or university students it's enough to use Module-III. In any case all the Modules could be used independently or even collectively for a single package.

The aspect of the Instructional design should be like a double edged sword. It should cut on both sides such as: the instructor should be able to utilize it with sharp application of it during instruction (Sprague and Stuart 2000), while the learner gets the benefit of the instruction promptly penetrating into the participants, clearly and precisely, "simple strategy can help students feel connected to the content, that they belong in the course or field, and reinforce their developing sense of competence and purpose", (Ambrose et al., 2010, p.183).

The design should have a pattern of consequent steps gradually and naturally flowing with logical sequence, "decompose complex tasks, identify weak or missing component skills, and track the effect of those gaps on student performance," (Lovett's 2001), whereby both the instructor and the instructed move into the content of

the instruction hand in hand, closely following the point of discussion. The instructional design should help reduce the cognitive load of the participants which may facilitate learning (Paas, Renkl, and Sweller 2003, 2004), at the same time the instructor should be able to identify those aspects that weigh heavily on the learner disrupting the goals of the instruction, hence, use an appropriate design that quickens the learning process. (Ambrose et al., 2010).

Module – I

1. Anecdote.

Narration of an incident. (Maybe a fable or fact or story or an event). Any audience will be involved in an instruction if it is interesting wherein the cognitive burden is reduced with narrative presentation (Sprague and Stuart 2000). The audience participation is optimum when the instruction brings about an interaction between one's expectations and cognition within the information structures (Paas et al., 2004). Hence, right at the beginning the instruction should draw the attention of the participants which is one of the purposes of the narration.

2. Connecting the key concept

The key concept of the Instructional Content (**Ins-Con**) should be connected with the narration. This is a very brilliant task of the instructor. Having an interesting anecdote or a fable is quite simple and possible to acquire easily, but the application to the Instructional Content is the most important skill of the instructor. (Tschannen-Moran and Woolfolk Hoy 2001). Hence the instructor should be comfortable with both the narrative content (**Nar-Con**) and the instructional content to make the key concepts merge.

3. Development of the narration

In due course of elaboration, one can present the anecdote suitable to the **Ins-Con**, and has to develop it considerably which is the fundamental message that has to be driven home. Communicating the information with proper explanations and developing the theme, are part and parcel of the design (Eggen and Kauchak 2004). Developing the narrative content clears all doubts and makes communication effective. Ability to simplify complex terminology, and draw analogies and examples are salient features of the instructions. (Westwood 2008, p.61)

4. Deriving the message from the narration

Message from the narration is both productive and progressive as a first phase outcome of the discussion, (Gettinger and Kohler 2006). It serves as a conclusion for the **Nar-Con** and could be utilized in the comparative correlation of the **Ins-Con** at any future reference. (Emmer et al., 1980). A synthesis at every stage is productive aspect that indicates a step by step approach to the argument of instruction (Cooper 2010).

Module – II

5. Focusing on the instructional Content.

Leaving the point of narration and **Focusing on the instructional Content** thus giving due importance to the core of discussion. Modern researchers suggest that in the higher level of studies, Opening the discussion with the main instruction could well have an impact on the students on fundamental 'informations and skills that are well defined' though presented in a logical sequence. (Ormrod 2000; Westwood 2008, p.12). Therefore the **Ins-con** in itself becomes a starting point of the discourse. Once the **Ins-con** is at its zenith of the discussion, use the **Nar-Con** to support the argument.

6. link the Instructional Content

Getting back into the Narrative Content to link the Instructional Content. The capacity of the instructor's efficiency plays a vital role at this juncture with all the experience to find proper co-relation (Byrne 1994), with the image and the real. The priority of the instructional content should be pointed out using the narrative content. Failing to indicate the priority would mean failure of the design. (Williams 2012).

7. The Sleuth of the design

Amplifying the theme of the Instructional Content and **opening up conversational dialogue to allow participation and sharing of opinion**, (Cooper 2010). from the audience... 'participatory – approach in learning process produces better results than passive spectator – approach learning', (Elliot & McGregor 2001; Cury et al., 2006). Instructor should coordinate instructional content and 'social skills objectives by using cues and consequences' that emerges through the open floor. (Smith and Gilles 2003)

Module – III

8. HIT the Instructional Content directly on the head,

While covering and connecting the propped up references, because different types of examples will help the students to grasp the theories and concepts, and enhance the capacity of the students to correlate in other contexts as well, (Ambrose et al., 2010).

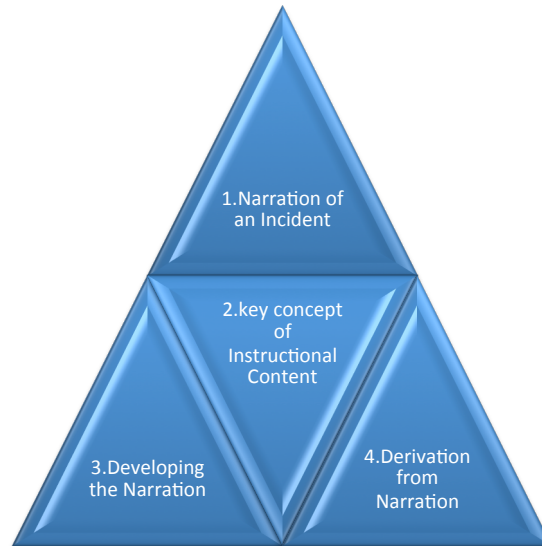
9. Point of reference to the Instructional Content

Blending the Narrative Content as a point of reference to the Instructional Content, using the utmost attention to the salient element of the Instructional content. Care should be taken not to dilute the main point while maintaining the design of the instruction. (Becker 1992).

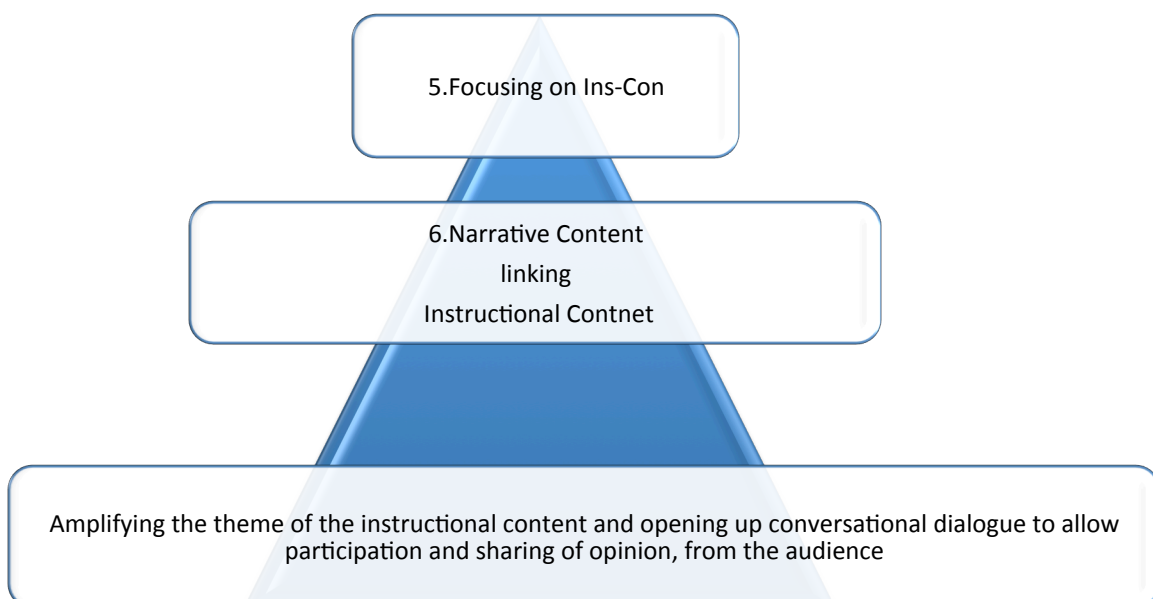
10. Priority for the Instructional Content

Concluding with priority for the Instructional Content, comprehending the entire presentation. The Instructor must try to give a coherent synthesis. (Wong 2005; Aloe et al., 2013). The last phase is also to coordinate the presentation of the **Ins-Con** with and verifying with the participants, students, (Wight and Chapparo 2008)

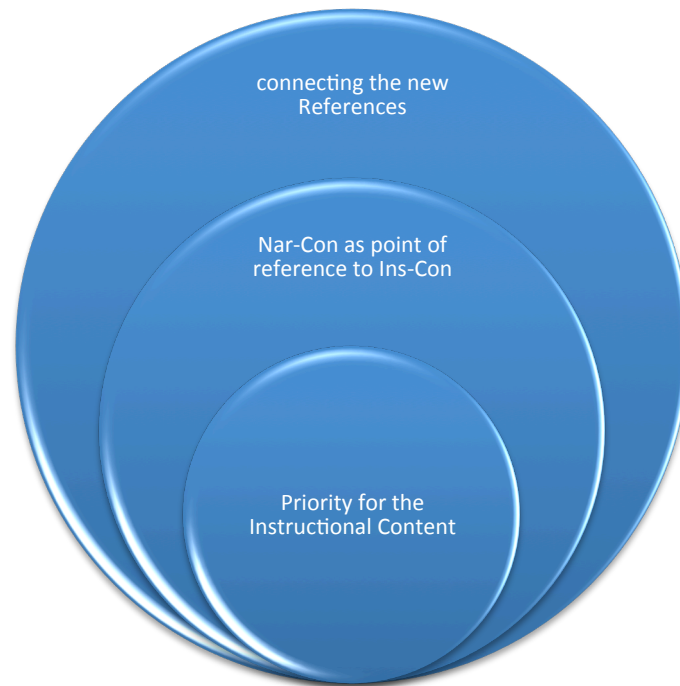
Module – I (fig:1)



Module – II (fig:2)



Module - III (fig:3)



CONCLUSION

The Instructional Design gives us ample chance for modifying and varying according to the need. There are instances with learning difficulties (Randall 2006), where we could create our own pattern and designs fitting for the ambient. The instructor should be able to induce creative thinking and active participation. (Carter et al., 2007). That is the aim and purpose of the Instructional Design.

References

- Aloe, A. M., Amo, L. C., Shanahan, M. E. (2013). *Classroom Management Self-Efficacy and Burnout: A Multivariate Meta-analysis*. New York: Springer Educational Psychology Review (2014) 26:101–126.
- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., Norman, M. K., (2010). *How learning works: 7 Research-based principles for smart teaching*. San Francisco: Jossey-Bass Publication
- Bandura, A. (1997). *Self-efficacy: the exercise of control*. New York: Freeman.
- Becker, B. J. (1992). *Using results from replicated studies to estimate linear models*. Journal of Educational and Behavioral Statistics, 17, 341–362.
- Becker, B. J. (2000). Multivariate meta-analysis. In H. E. A. Tinsley, S. D. Brown (Eds.), *Handbook of applied multivariate statistics and mathematical modeling* (pp. 499–525). San Diego: Academic.
- Burns, George. W. (2005). *101 Healing Stories for Kids and Teens: Using Metaphors in Therapy*. New Jersey: Published by John Wiley & Sons, Inc., Hoboken.
- Byrne, B. M. (1994). *Burnout: testing for the validity, replication, and invariance of causal structure across elementary, intermediate, and secondary teachers*. American Educational Research Journal, 31(3), 645–673.
- Carter, C., Bishop, J., Kravits, S. L. (2007). *Keys to College Studying: Becoming an Active Thinker*. New Jersey: Pearson Education Inc., Upper Saddle River.
- Clarke, T. A., Ayres, P. L., Sweller, J. (2005). The impact of sequencing and prior knowledge on learning mathematics through spreadsheet applications. *Educational Technology Research and Development*, 53, 15 – 24.
- Cooper, H. M. (2010). *Research synthesis and meta-analysis: a step-by-step approach*. Thousand Oaks: Sage.
- Cury, F., Elliot, A. J., Da Fonseca, D., Moller, A. C. (2006). The social-cognitive model of achievement motivation and the 2002 achievement framework. *Journal of Personality and Social Psychology*, 90 (4), 666 – 679.
- Eggen, P., & Kauchak, D. (2004). *Educational psychology: windows on classrooms* (6th ed.). Upper Saddle River, NJ: Pearson-Merrill.

- Elliot, A. J., McGregor, H. A. (2001). A 2002 Achievement Goal Framework. *Journal of Personality and Social Psychology*, 80 (3), 501 – 519.
- Emmer, E. T., Evertson, C. M., Anderson, L. M. (1980). *Effective classroom management at the beginning of the school year*. The Elementary School Journal, 80(5), 219–231.
- Gettinger, M., Kohler, K. M. (2006). Process-outcome approaches to classroom management and Effective teaching. In C.M. Evertson C. S. Weinstein (Eds.), *Handbook of classroom management: research, practice and contemporary issues* (pp. 73–95). Mahwah, NJ: Erlbaum.
- Lovett, M. C. (2001). A collaborative convergence on studying reasoning processes: A case study in statistics. In S.Carver & D. Klahr (Eds.), *Cognition and instruction: Twenty - five years of progress* (pp. 347 – 384). Mahwah, NJ : Erlbaum.
- National Research Council (2000). *How people learn: Brain, mind, experience, and school*. Washington, D.C.: National Academy Press.
- National Research Council (2001). *Knowing what students know: The science and design of educational assessment*. Washington, DC: National Academy Press.
- Ormrod, J. E. (2000). *Educational psychology: Developing learners* (3rd ed.). Upper Saddle River, NJ: Merrill-Prentice
- Hall. In Westwood, P., (2008). *What teachers need to know about Teaching methods*. Australia: Acer Press, Victoria, 3124.
- Paas, F., Renkl, A., & Sweller, J. (2003). Cognitive load theory and instructional design: Recent developments. *Educational Psychologist*, 38 (1), 1 – 4.
- Paas, F., Renkl, A., Sweller, J. (2004). Cognitive load theory: Instructional implications of the interaction between information structures and cognitive architecture. *Instructional Science*, 32, 1 – 8
- Pritchard, A., Woollard, J. (2010). *Psychology for the classroom : constructivism and social learning*. New York: Routledge Publication. Psychology for the classroom series
- Randall, S. V., (ed.). (2006). *Learning Disabilities: New Research*. NY: Nova Science Publishers, Inc.,
- Smith, S. W., & Gilles, D. L. (2003). Using key instructional elements to systematically promote social skill generalization for students with challenging behavior. [Electronic version]. *Intervention in School and Clinic*, 39(1), 30-37.
- Retrieved September 12, 2006, from Wilson Web database. In Smith, C., Williamson, R., Siegel-Robertson, J. (2006) *Implementing Technology to Teach Social Skills to Students with Multiple High-Incidence Disabilities*: University of Memphis.
- Sprague, J., & Stuart, D. (2000). *The speaker's handbook*. Fort Worth, TX : Harcourt College Publishers.
- Stevens, D. D., & Levi, A. J. (2005). *Introduction to rubrics: An assessment tool to save grading time, convey effective feedback and promote student learning*. Sterling, VA : Stylus.
- Tschannen-Moran, M., Woolfolk Hoy, A. (2001). *Teacher efficacy: capturing an elusive construct*. Teaching and Teacher Education, 17, 783–805.
- Westwood, P., (2008). *What teachers need to know about Teaching methods*. Australia: Acer Press, Victoria, 3124.
- Wight, M. and Chapparo, C. (2008). *Social competence and learning difficulties: Teacher Perceptions*, Australian Occupational Therapy Journal 55(4): 256–265.
- *Williams, A. Y. (2012). Applications of Dweck's model of implicit theories to teachers' self- efficacy And emotional experiences. Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses Database. (3543617). In
- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., Norman, M. K., (2010). *How learning works: 7 Research-based principles for smart teaching*. San Francisco: Jossey-Bass Publication.
- Wong, H. K. (2005). New teacher induction: the foundation for comprehensive, coherent, and sustained professional development. In H. Portner (Ed.), *Teacher mentoring and induction: the state of the art and beyond* (pp. 41–58). Thousand Oaks: Corwin.

Architecture And Ideological Movements: Using Ideological Movements As A Concept In The Architectural Design Process

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ABSTRACT

The concept of ideology has different definitions that change due to time and space. These definitions alter according to different disciplines or perspectives. In short, beside its philosophical definition, the concept of ideology has physiologic, semiotic, linguistic, politic and epistemological definitions. At this point it is important to distinguish ideology from ideologies. Ideology refers to certain type form of thinking or a conscious form while ideologies refer to specific type of ideas/values, which belong to various social groups that are gathered together to express themselves. In order to clarify the distinction, it is important to understand first definition as ideology and second definition as politic ideologies. In this context this study examines architectural design process through ideological movements that can be defined as political ideologies. When the debates on the effect of ideology on architectural space, the discussions have two different axes: first one is using political power as an ideological medium, which is called ideological architecture. Second one is producing an expression of form through the designer his/herself ideology, which is called ideology of architecture. This study carries on the debates on the ideology and architecture into different level and overlaps the two different axes into single one. In other words, it demonstrates that ideological architecture and ideology of architecture can be produced simultaneously. Regarding that, the study was conducted in Architectural Design Studio-5 at KTU in 2014-2015-fall semester. The concept of the museum was given to the student in a specific space. The political ideology was chosen through anarchism, feminism, communism, capitalism, liberalism, fascism, corporatism, anarchism, terrorism, imperialisms, kemalism. The main purpose of the project is to observe the architectural design process of the student through a political ideology for the given defined space.

INTRODUCTION

Architectural design is interpretation, determination and documentation of conceptual, functional, figural, structural and actual features of all elements in the fiction of construction to perform all determined functions to meet requirements (Izgi, 1999). Architectural design problems are complex problems. The possible solution for a design problem must provide the demands group and the interactions between these demands. However, the amount of information about the solution of design problem is too much and it is generally about discipline (Inan and Yildirim, 2009). The architectural design is an interdisciplinary team work between own information area of architecture and many different information areas. Today, the information area of expert persons from different disciplines are needed for designing the structures with complex functions. Design progress of architecture has changed with the expertise areas of architects and different disciplines. The traditional design methods have been interdisciplinary in architecture area. This means that the architectural information area does not have its significant limits as all science areas. This immensity of architecture has especially been an important stage of architectural education. By considering the other work areas', in other words interdisciplinary frame, of architecture and education, this study targets to review architecture and ideology information areas/interdisciplinary communication/effects on each other/producing each other.

The aim of this study is to question or try how ideology and architecture relation is effective on the architecture production. The main problem area is how the ideological flows may be used in architecture according to the interdisciplinary information content of the architecture.

This study, in which the architecture and ideology relation is questioned by considering the interdisciplinary status of architecture, was made with 10 students in architectural project 5 lesson at the 3rd class of fall term 2014-2015 in KTU Architecture Faculty's Architecture Department. The project matter place was given as "museum" to the students and the project concept was determined as the ideological flows writers. In other words, the students designed a museum for a flow to be selected among the ideological flows. The main target of the project is to see how the architectural place is designed by using the determined political flow by the students.

THE STUDY

Power always takes advantage of art and architecture. Architecture and art have been seen as an ideological tool through the ages. After the eighteenth century, architecture is used in urbanization, politics, public, health and special issues. Thus, the effects of power is reflected on the place both in urban and single structure scale. The presence of power is transferred to the human mind with certain signs and passwords on all corners of the city. The power uses architecture for settling bodies on places (Foucault, 1984). Since the date when the people started living collectively, the positions of managers and managed people in the society, their living places, association of these places have been interesting subjects (Polat, 2009). Using architecture as an ideological symbol is the most common form of ideological architecture. For example, the palace structures are ideological symbols in all details. As another example, the demand of Hitler to make the strongest structure on earth reveal ideology and architecture relation. This shows that architecture is one of the main tools in legalization of ideologies. Because, building the physical environment is an indicator of ideologies. In this context, a structure to be designed in association with any ideology must have the features of related ideology. The product of the physical space or architecture is the point where this ideological theme is felt/seen/reflected objectively. Tanyeli (1989) describes the effect of ideology on architecture as follows; "ideologies try to reveal some principles on how a product will be revealed. This design principle is usually an answer mold and ideological slogan and its purpose is to show ways to the architect on how to design and interpret the product."

The main situation, which must be paid attention/scared of/realized in the texts in which architecture and ideology concepts are together, is the assumption that ideological architecture concept and architecture ideology concept are the same. Because, the concept of architecture ideology describes the opinion structure of architecture. This opinion structure is an interpretation science which develops with science, culture, philosophy and production values with general and main approaches of the architecture profession. In other words, the architecture ideology is actually the areas in which the idea of architecture is built. Ideological architecture is the physical match of a defined and determined ideology. Rather than the ideology had by the architecture, it is the reflection of ideology it presents. At this point, examination of the ideology concept will make the text based on a more consistent ground.

McLellan (2005) mentioned that a set of philosophical questions, regarding the meanings of nature, human and society, has revealed against the Western European intellectuals after the end of Medieval world and these questions were supported with new views defending the individual and the liberty of conscience (McLellan, 2005). Francis Bacon is among the thinkers suggesting examination based on critics against the mythological interpretation of the world during this period. Bacon (1994) stated that the human thoughts described faulty and irrational understandings and stayed behind the idols and he started the modern social sciences with the idols theory he developed here.

The ideology concept is a product of French Revolution, due to the fact that it matches a systematic area. The person who started to use ideology word itself for the first time is the French Thinker Antoine Destutt de Tracy (1755-1836). In his work named Elements of Ideology (Eléments d'idéologie) (1817-1818), he suggested a new ideas science to be base for all the other sciences. According to De Tracy, examination of thoughts' origin in an independent way will open the way to a fair and happy society. Although the term 'ideology' is a product of French Revolution, Carl Marx and his followers were the ones who based the ideology concept to the agenda of political statements. Kilicaslan (2008) mentioned that the 'ideology' term has been used in narrower and negative meanings as a general and objective approach to "ideas and thoughts" and the term has lost meaning as "feelings, behaviors and thoughts system regarding world, society and human" and the term has gained negative meaning by being described as "the ideas system used for legalizing special benefits of a person, group and society".

According to Althusser, the function of ideology is to convince persons on the fact that they are free and autonomous subjects. The subject is an entity submitting to both an independent individual and a stronger authority and having no freedom than accepting its submission. Again according to Althusser, ideology is not a product of human mind, it is a phenomenon having a half existence in churches, associations and schools with a variety of concepts and social mortar. "Mortar" term given to the ideological by Althusser can be accepted as existence/creation of the ideological flows and the feature of "association/holding together".

The relation of architecture and ideology concepts with each other brings out the question how the ideological flow or the ideology can be effective on the architectural design. When this question is considered with a wider perspective, the main problem of the study reveals. How can an architectural place be designed by considering an ideology described other than an ideology had by a designer or, in other words, how can a place be produces on the ideology?

The transformation of paradigm work in today's design world necessitates the re-transformation of education. The whole of concepts, values and techniques regarding the other disciplines than the architecture can be used for describing the design paradoxes and solutions. The students must be aware of the changing balance of the architectural paradoxes requiring a more holistic point of view for developing the creative thinking and transforming the information flow (Erkok et al., 2005). In this context, the output point of this study is the interdisciplinary status of paradigm changes in education/area/production/design of the architecture mentioned above.

This study was made with 10 students in architectural project 4 lesson at the fall term 2014-2015 in KTU Architecture Faculty's Architecture Department. The study is a workshop lasting 16 weeks and 8 hours a week. At the first stage, the students were given 2-week seminars regarding the ideology, ideological flows and architectural ideology relation. Then each student selected a different ideological flow among the ideological flows given. Selected flows are listed as follows: anarchism, communism, capitalism, liberalism, fascism, imperialism, corporatism, feminism, terrorism, Kemalism. The study will be on a more consistent ground when short information on the aforementioned ideological flows are given.

1. Anarchism

Anarchism is a social term defending the disposal of social authority, power and hierarchy in all terms and defining the political philosophies and social behaviors on this. Anarchism is to reject the authority of all kinds in all circumstances. One of the fundamental principles of anarchism is to be against compelling institutions and social hierarchies (URL-1). Anarchy is usually defined as a society without government and anarchism is the social philosophy targeting to realize this. Today, the concept of anarchism is used for stating the situation of a person living without a government or not based on a institutional authority (Girgin, 2011).

2. Communism

This is a social, political and economic ideology and movement to arrange the society live without state, classes and money based on common ownership on the production tools. The reason on the ground of communism is the demand to establish a society living without classes and with common properties. With the general meaning, all individuals are equal in the societies without class (URL-2).

3. Capitalism

Capitalism is a social and economic system and a mode of production in which trade, industries, and the means of production are largely or entirely privately owned. In this system, private firms and proprietorships usually operate in order to generate profit, but may operate as private nonprofit organizations (URL-3).

4. Liberalism

Liberalism is a political philosophy or worldview founded on ideas of liberty and equality (URL-4).

5. Fascism

This is a heavy dictatorship which ended the political democracy in order to keep capitalism in the period when political democracy committed against capitalism. On this case, there is an abstract state philosophy and the realities of life will be covered with this magnificent government fog. In the field of the theory, fascism adopts Machievelli and supports accuracy and actuality of Mussolini, and Machievelli's methods. Everything is in the State in fascism. There is no value other than the state. The fascist state, as the combination of all values, solves, develops and manages the life of society and individuals in details (URL-5).

6. Imperialism

Spread of a nation or society on an another nation or society directly or indirectly with political, economic, cultural or discursive terms. Thus, imperialism is fundamentally about power as aims and tools. Imperialism is founded by soulful slogans, symbols of war, superior military, economic, political or cultural power and it regenerates itself. For this reason, imperialism generally means the relation between different cultures and the inequitable exchange between them. Imperialism is based on the removal of the other's independent, legal, economic presence rights. In the end, the imperialist powers have all kinds of rights on the societies they controlled (URL-5).

7. Corporatism

It is regular production for all consumers by all producers which are all consumers, too. Corporatism is a political approach which bases all activities on solidarity and common interests as result of seeing the society with a organization perspective. Predictably, the differences of different sections can only live or reveal according to the benefits of the state (URL-6).

8. Feminism

Feminism is an effort to remove the inequalities of women by recognizing the women rights. The main objectives of feminism contain equal rights on education, business, child care and legal abortion rights, women health development and prevention of harassment and rape. Gender equality means giving same rights to all genders in all life aspects (URL-7).

9. Terrorism

Terrorism is commonly defined as violent acts or the threat of violent acts intended to create fear , perpetrated for an economic, religious, political, or ideological goal, and which deliberately target or disregard the safety of non-combatants (URL-5).

10. Kemalism

This is an ideological movement unique to Turkey's conditions and the Republic of Turkey and it associates the infrastructure of flows in Harbiye, the intellectual class on Ottoman Empire, Jon-Turk movement and the French revolution and the nation-state system brought by it with the positivism liberal philosophies in the 19th century (URL-5).

FINDINGS

Table 1: Museum design of student Berat Ozturk with anarchism subject


Selected Ideology	Design Concepts	Design
Anarchism	<ul style="list-style-type: none"> Disrupt the existing order Creating a new order 	
Explanation of Design	In this context, the student described an alternative form for the square form by separating the square form with a concept. The concept is supported with inconsistent and non-defined scratches on the side	

Table 2: Museum design of student Isin Iren Tasci with communism subject

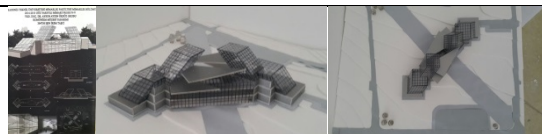
Selected Ideology	Design Concepts	Design
Communism	<ul style="list-style-type: none"> Standardization Dominance Design on humanscale Strict equality 	
Explanation of Design	In this context, the student firstly created a form with strict symmetry with the concepts created. The designed structure is much higher than the human scale and the scale overwhelming the user was used in the interior place. The design was made to be on a dominant position in higher scales.	

Table 3: Museum design of student Merve Yadigaroglu with capitalism subject


Selected Ideology	Design Concepts	Design
Capitalism	<ul style="list-style-type: none"> Rivalry Competition Standing out Benefiting over each other 	
Explanation of Design	The student differentiates the created concepts with rectangular forms and small angles and he created a competing and non-defined design trying to stand out and benefit over each other.	

Table 4. Museum design of student Emre Umut Bahceci with liberalism subject


Selected Ideology	Design Concepts	Design
Liberalism	<ul style="list-style-type: none"> • Balance • Liberty • Pluralistic 	
Explanation of Design	The student especially thought of the liberty concept, but he associated the rectangular forms with a vertical axis without standing out.	

Table 5. Museum design of student Muhammed Akbulut with fascism subject


Selected Ideology	Design Concepts	Design
Fascism	<ul style="list-style-type: none"> • Violence • Single dominion • Union • Dominant • Pressure 	
Explanation of Design	The student started with the idea of single dominion and he tried to express the whole design under a single cover. He especially tried to define strict and pressuring concepts with a linear rectangular conflict.	

Table 6. Museum design of student İrem Ezme with imperialism subject

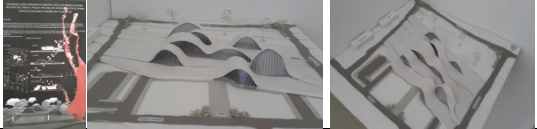
Selected Ideology	Design Concepts	Design
Imperialism	<ul style="list-style-type: none"> • Occupancy • Dominion • Government • Pressure • Diffusionism • Utilization 	
Explanation of Design	The student designed the project under the ground layer by firstly considering diffusionism and occupancy concepts. The mass was kept under the ground from outside and light was given only from the windows.	

Table 7. Museum design of student Merve Cakiroglu with corporatism subject


Selected Ideology	Design Concepts	Design
Corporatism	<ul style="list-style-type: none"> • Layout • Justice • Diversity as a whole • Stratification 	
Explanation of Design	The student tried to establish a singular order over the order of different sections in themselves and he overlapped a singular square form with different angles.	

Table 8. Museum design of student Sinem Demir with feminism subject

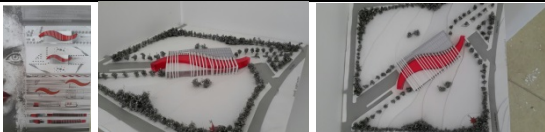
Selected Ideology	Design Concepts	Design
Feminism	<ul style="list-style-type: none"> • Equality 	
Explanation of Design	The student started only with the concept of equality and the equality of two different genders as masculine and feminine was reflected on the forms. The feminine one was expressed with a curvilinear form and the masculine one was expressed with a rectangular form. There are equal scales in both forms as superimposed and square meters.	

Table 9. Museum design of student Feyza Altintas with terrorism subject

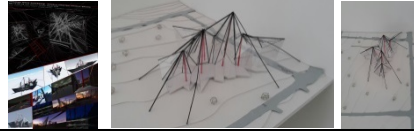

Selected Ideology	Design Concepts	Design
Terrorism	<ul style="list-style-type: none"> • Violence • Pressure 	
Explanation of Design	The student especially focused on the violence concept. A single square plasma was separated with non-defined lights on many axis. The internal places were created with extremely solid triangles and the connection of outer and internal places was cut.	

Table 10. Museum design of student Onder Er with Kemalism subject

Selected Ideology	Design Concepts	Design
Kemalism	<ul style="list-style-type: none"> • Change • Progress • Conversion 	
Explanation of Design	The student started with the concept of change and he converted a main rectangular form in itself by dividing it into four non-defined parts. However, this conversion did not ruin the singular integrity.	

CONCLUSIONS

At the result of this study, which questions how ideology-architecture relation is effective on architectural production, it is seen that the architecture is one of the legalization tools of ideology. However, when designer, architecture and ideology triangle comes together, the question how the place can be created on an ideology to conceptualize the ideology out of the designer's own, can be answered with the interdisciplinary status of architectural information. In other words, the place can be designed by conceptualizing the ideology which is the problem area of designer and benefiting from different disciplines at the stage of production. Especially in the architecture education, making the design stage (regardless of how abstract it is) over the concept shows that the design can be made directly related to the subject.

As a result, it is seen that the own subjective information area of architecture is overlapped with the other information areas at the design progress. Especially, production of the designed place on the concept creates more information area in the mind of student and a free design stage is described in the design stage.

References

- İzgi, U. (1999). Mimarlıkta Süreç Kavramlar, İlişkiler, 1. Press, YEM Publishing, İstanbul, 199,200.
- İnan, N. and Yıldırım, T. (2009). Mimari Tasarım Sürecinde Disiplinler Arası İlişkiler ve Eş Zamanlı- Dijital Ortam Tasarım Olanakları, *Gazi University Engineering-Architecture Faculty Journal*, 24, 4, 583, 595, Ankara.
- Foucault, M., 2000. Deliliğin Tarihi, translation. Mehmet Ali Kılıçbay, Ankara.
- Polat, M., 2009. Bir Sembol Olarak “İdeoloji”nin Mimarideki Kavramsal ve Mekansal Etkileri Başkentlerin İmarî Üzerinden Bir Karşılaştırma Ankara Örneği, PhD Thesis, MSGSU, The Institute of Science, İstanbul.
- Tanyeli, U., (1989). “Mimarlıkta İdeolojik Amentü”, *Mimarlık Journal*, 1989/4:78-81
- David McLellan, (2005), İdeoloji, İstanbul Bilgi University Publishing, İstanbul.
- Bacon, F., (1994), Novum Organum, Volume 3, Paul Carus Student Editions: Illinois, Carus Publishing Company.
- H. Barth, (1961), Wahrheit und Ideologie, Eugen Reutsch Verlag, Zurich an Stuttgart, 45.
- Kılıçaslan, E., (2008), Siyasal İletişimde İdeolojik Dil, Master Thesis, Trakya University, The Institute of Social Sciences, Edirne.
- K. Marx, F. Engels, (1965), Selected Correspondence, Progress, Moscow, s.169.
- Erkök F., Demirel Eren Ç, Uz Sönmez F., Aydın S, (2005). A Paradigm Shift In The First Year Design Education, A-Z ITU Journal of The Faculty of Architecture, 1/2, V.2, 62, İstanbul.
- Girgin G., (2011) Anarşizm ve Ekoloji, Master Thesis, Cumhuriyet University, The Institute of Social Sciences, Sivas.
- URL-1, 2015. <https://tr.wikipedia.org/wiki/Anar%C5%9Fizm>, 25 Haziran 2015.
- URL-2, 2015. <https://tr.wikipedia.org/wiki/Anar%C5%9Fizm>, 25 June 2015.
- URL-3, 2015. <https://tr.wikipedia.org/wiki/Kapitalizm>, 25 June 2015.
- URL-4, 2015. <https://tr.wikipedia.org/wiki/Liberalizm>, 25 June 2015.

URL-5, 2015. <http://blogcu.com/izm-ler-politik-ve-siyasi-sistemler/9851043>, 25 June 2015.

URL-6, 2015. <https://tr.wikipedia.org/wiki/Korporatizm>, 25 June 2015.

URL_7, 2015. <https://tr.wikipedia.org/wiki/Feminizm>, 25 June 2015.

Beliefs About Personal Competence Among Pedagogical Formation Students With Regard To The Teaching Profession

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ABSTRACT

This research was conducted with the purpose of analyzing the levels of sense of personal competence regarding the teaching profession, based on gender, by students receiving pedagogical formation training at the Inonu University Faculty of Education and the faculty of graduation. Four hundred four students receiving pedagogical formation training were included in the study. The "Teacher's Sense of Personal Competence Scale" developed by Tschannen - Moran and Hoy (2001) and adapted to Turkish by Çapa, Çakıroğlu, and Sarıkaya (2005) was used as a data collection tool in the study. The average (\bar{X}), t-test, and one way analysis of variance (ANOVA) tests were used in the data analysis. As a result of the research, the sense of personal competence felt by pedagogical formation students in regard to the teaching profession were found to be at a sufficient level, while their perceptions of personal competence were observed to show significant variance depending on the faculty of graduation and gender.

INTRODUCTION

Qualified trained manpower is the most important resource for the future of society. Great responsibility falls on teachers in providing this (Gömleksiz, 2002, p. 150). Because of this, people and individuals have expected outstanding accomplishments from teachers with respect to their profession and have given teaching a high status and value in order to achieve these expectations (Başaran, 1994, s.77). It is important for the teaching profession, given such value, to be pursued by enthusiastic individuals who love what they do (Yılman, 2006, s. 181). For this reason, the human skills necessary for teachers to embrace their profession require a positive sense of personal competence (Bandura, 1989, p. 1176).

Concepts such as the duties, responsibilities, roles, and qualifications of teachers, who are ascribed quite a comprehensive role in education, the most common purpose of which is to turn individuals into persons beneficial to society (Küçükahmet, 2012, p. 180), are critical factors in shaping the classroom environment in a fashion fit for its purpose (Helvacı, 2010, p. 297). In the profession of teaching, which at its core is the first and oldest profession based on the cultivation of individuals (Çelikkaya, 2014, p. 6,8), these competencies refer to the qualities possessed in order to be able to deliver education and training in the most effective way; and the knowledge, understanding, skills, and attitude that must be present in order to be able to fulfill the tasks and duties required by the teaching profession (Şahin, 2009, p. 291).

With the increase today in teachers' duties and responsibilities, professional competency, a concept associated with the specialized knowledge, skills, and the power to do a job and to maintain that job, has gained importance in relation to raising the quality of education (Çelebi, 2014, p. 127). The ability of teachers to appropriately meet these qualifications depends not just on their having received a good training, but also on their belief that they can perform their tasks and duties as required (Gürol, Altunbaş, and Karaaslan, 2010, p. 1396).

The concept of competency, defined as the power of a person to hold rights, to be able to use their rights, to be able to perform a job, to be able to take on duties and responsibilities (TDK, 2015), and which includes certain cognitive and intuitive processes, is based on a social-cognitive theory that was first formed by Bandura (Bandura, 1993, p. 117). Teacher competency, on the other hand, can be described as a factor explaining individual differences in effective training (Gibson and Dembo, 1984, p. 569). In terms of the teaching profession, it means having the capability to effectively fulfill such functions as being planned, speaking properly, and being able to use various tools for the application of methods (Açıkgöz, 2000, p. 82). Also, having a positive impact on student learning and being directly proportional to student achievement indicates that not everyone is capable of teaching (Kushner, 1993, p. 1). Aside from this, factors such as student motivation, adoption of innovation, classroom management techniques, and the efficiency of the teaching are also concepts that comprise competency (Woolfolk and Hoy, 1990, p. 81).

The belief of personal competence is the confidence or judgments held by a teacher as to their ability to achieve critical educational missions (Wolters and Daugherty, 2007, p. 181). It is their belief that they can successfully demonstrate the behaviors needed to achieve the desired result (Bandura, 1977, p. 193). The self-confidence of teachers as to their ability to demonstrate the behaviors that will enable students to learn is one of the few personal traits providing reliable predictions about student outcomes and teacher practices (Poulou, 2007, p. 192). This faith and level of confidence by the teacher in their ability to organize learning depends on their past experiences and school culture (Protheroe, 2008, p. 42).

Personal competence is a basic concept that is believed to have an effect on behavior. It is the perception, belief, and judgment of an individual as to their ability and their capacity to cope with different situations, and to succeed in a certain activity (Senemoğlu, 2012, p. 228). The belief of self-competence, on the other hand, is the capacity of individuals to organize and successfully put forward the necessary activities to demonstrate ascertain performance in events that affect their lives. Belief in self-competence is a determinant of how an individual feels and thinks, their personal motivation, and their behaviors. A strong sense of self-competence improves many aspects of human well-being and personal success. In this sense, individuals with high confidence about their capacities, rather than treat difficult tasks as a threat to be avoided, see them as challenges providing new learning opportunities. Such an effective outlook reduces stress during activities and nurtures deep concentration and basic interest (Bandura, 1994, p. 71). Expectations directly affecting the perception of self-competence constitute an important factor that affects the teacher's choice of behavior and the efforts they make to achieve certain results. In this sense, the expectation of competence is a teacher's belief that they can successfully perform the activities required to reach a particular outcome (Bandura, 1977, p. 193).

According to Bandura (1997, p. 1), people with a high sense of personal competence possess cognitive features such as willingness, a broad horizon, straight thinking, readiness in the face of adversities, and a stable commitment to overcoming obstacles. By shaping their beliefs as to what they can do, they can predict possible outcomes beforehand. They can plan their course of action by organizing goals. Owing to risk management, they feel less under pressure. They are in control of disturbing thoughts.

Jerald (2007, p. 1) argues that a teacher with a high sense of self-competence has a high level of planning and organization. He or she is more open to new ideas to better meet student needs and is more willing to try new methods. (S)he is more patient and flexible when things go wrong. (S)he is less critical of student errors. (S)he is less willing to refer difficult students to special education.

Teacher perception of self-competence was first conceptualized in 1976. In a study performed in a school's elective reading program, a strong and significant relationship was found between the reading test scores of students and teachers' sense of self-competence (Armor, et al., 1976, p. 24). A positive correlation was determined in another study between teachers' sense of self-competence and the rate of reaching goals, teacher innovation, and increased student performance (Ashton, 1984, p. 30). It has emerged as a powerful explanatory variable in increasing student and teacher performance, sustaining educational activities, and reaching goals (Bergman et al., 1977, p. 11). It has been observed that confident teachers who deemed themselves highly competent at teaching were quite effective in new educational practices requiring skills; also, these were the teachers who were most understanding and open to innovation (Guskey, 1987, p. 10). Teachers with a high sense of personal and instructional competence were more passionate than their counterparts and had higher end-of-year goals (Allinder, 1995, p. 251; Poulou 2007, p. 191; Bulut and Oral, 2011, p. 1); that a healthy school climate incorporating an effective administrative control and academic effectiveness contributed to the teachers' development of the sense of self-competence that may have an impact on students' learning (Hoy and Woolfolk, 1993, p. 355). A significant relationship was found between a teacher's self-competence in terms of classroom management and observed classroom organization and educational and emotional support. In other words, the teachers who considered themselves more competent at reducing and managing unwanted behaviors were observed to effectively manage behaviors, use the time allotted for education in a productive way, and to provide a variety of types of support to the students in the educational and emotional sense (Ryan et al., 2015, p. 152). The willingness to utilize more interesting and challenging teaching techniques and creative programs, and classroom management practices directed at developmental, affective, and cognitive aims have also been determined to be associated with a high sense of self-competence (Ross, 1994, p. 2). Female teacher candidates were found to deem themselves more competent with respect to student participation and class management, while male teacher candidates found themselves more competent about teaching strategies (Aydemir et al., 2014, p. 164). In addition to this, prospective teachers were seen to have fears of miscommunication with the students during class (Morgil et al., 2004, p. 70), to have a more positive attitude than teachers on duty (Arslan, 2013, p. 71), and no differences were observed between the sense of self-competence between education faculty

graduates and graduates of the arts and sciences faculty receiving formation training (Elkatmış et al., 2013, p. 41).

RESEARCH AIM

The aim of this study was to determine levels of sense of self-competence on the part of pedagogical formation students with respect to the teaching profession. Furthermore, the analysis of their sense of self-competence based on gender and the faculty of graduation was aimed.

METHODS

This section includes the model of the research, the characteristics of the group included in the study, the data collection tool, and the statistical methods used in data analysis.

The Model of the Research

The correlational survey method was used in this study. Survey researches are a model of research aimed at describing a condition existing in the past or at the present as it is (Karasar, 2009, p. 77). In addition to this, determining the relationships enables the researcher to make an estimate. The aim is to better understand the phenomenon. Research examining relationships and connections is called correlational research (Büyüköztürk, Çakmak, Akgün, Karadeniz, and Demirel, 2010, p. 22).

The Working Group

This study was conducted with data collected from Inonu University pedagogical formation students. The aim was to access all the students who received pedagogical formation training in 2014. Within this scope, 404 teachers were included in the study. Characteristics of the study population are given in Table 1.

Table 1. Characteristics of The Study Population Participating in Research

		Faculty				
		Arts and Sciences	Theology	Health Sciences	Fine Arts	Total
Gender	Woman(N)	181	58	9	14	262
	Man(N)	98	34	1	9	142
Total		279	92	10	23	404

Two hundred sixty-two of the pedagogical formation students participating in the study were female, while 142 were male. Two hundred seventy-nine were arts and sciences graduates, 92 were theology graduates, 10 were health sciences graduates, and 23 were fine arts graduates.

The Data Collection Tool

The "Teacher's Sense of Personal Competence Scale," developed by Tschannen - Moran and Hoy (2001) and adapted to Turkish by Çapa, Çakıroğlu and Sarıkaya (2005), was used as a data collection tool. The scale, which consists of 24 items in total, consists of three subscales, including "student participation," "teaching strategy," and "classroom management." The scale reliability is 0.94 for the total self-competence score, 0.87 for student participation, 0.91 for teaching strategies, and 0.90 for classroom management (Tschannen-Moran and Woolfolk Hoy, 2001). In the study they conducted in Turkey on teaching candidates, Çapa, Çakıroğlu, and Sarıkaya (2005) found the reliability values to be 0.93 for the total self-competence score, 0.82 for student participation, 0.86 for teaching strategies, and 0.86 for classroom management. The items included in the scale were classified into categories as follows: (1) "incompetent"; (2) "slightly competent"; (3) "somewhat competent"; (4) "fairly competent"; and (5) "very competent".

Data Analysis

The average (\bar{X}), the t-test for independent variables with two categories, and the single factor analysis of variance (ANOVA) for independent variables with more than two categories was used in the analysis of the data obtained. Data were analyzed by SPSS. The Scheffe test was used to determine the differences between the groups. The level of significance in the analysis of data obtained was accepted as $p < 0.05$.

RESULTS

In this section, the findings obtained from the analysis of data collected from students of pedagogical formation are given in as tables and reviewed.

Table 2. Average Score of Pedagogical Formation Students Self- Competence About The Teaching Profession

		()	Sd
Subscale	Provide student participation	3,88	,43
	Teaching strategies	3,91	,44
	Class management	3,92	,48
Beliefs Of Self-Competence About The Teaching Profession		3,90	,38

As shown in Table 2, the sense of self-competence of pedagogical formation students with respect to student participation ($\bar{X} = 3.88$), teaching strategy ($\bar{X} = 3.91$), and classroom management ($\bar{X} = 3.92$) can be said to be at a sufficient level. Beliefs of self-competence about the teaching profession ($\bar{X} = 3.90$) also seem to be at a sufficient level.

Table 3. Pedagogical Formation Students Self- Competence Beliefs About The Teaching Profession by Gender
T- Test Results

		Gender	N		df	Sd	t	p
Subscale	Provide student participation	Woman	262	3,87	402	,42	,252	,80
		Man	142	3,88		,44		
	Teaching strategies	Woman	262	3,87	402	,45	2,367	,02
		Man	142	3,98		,41		
	Class management	Woman	262	3,88	402	,50	2,058	,04
		Man	142	3,98		,44		
Total score		Woman	262	3,88	402	,40	1,841	,57
		Man	142	3,95		,35		

$p < .05$

Upon examining Table 3, the self-competence beliefs of pedagogical formation students about teaching strategies [$t_{((402))} = 2.367, p < 0.05$] and classroom management [$t_{((402))} = 2.058, p < 0.05$] indicated a significant difference based on gender. When considering the mean averages, it can be stated that male students perceived themselves to be significantly more competent with respect to teaching strategies ($\bar{X} = 3.98$) and classroom management ($\bar{X} = 3.98$) compared to women. However, beliefs of self-competence about student participation did not indicate a significant difference based on gender [$t_{((402))} = 0.252, p > 0.05$]. Additionally, the average scores obtained from the entire scale did not indicate a significant gender based difference [$t_{((402))} = 1.841, p > 0.05$]. When overall scores are taken into consideration, there was no significant difference between female and male formation students as to their sense of self-competence with respect to the teaching profession.

Table 4. Pedagogical Formation Students Self- Competence Beliefs About The Teaching Profession by Faculty of Graduation ANOVA Results

Of Graduation ANOVA Results							
	Faculty	N	Sd	f	p	Significant difference	
Provide student participation	Arts and Sciences (A)	279	3,91	,41	3,55	,015	A-T
	Theology (T)	92	3,77	,45			
	Health Sciences (H)	10	3,70	,43			
	Fine Arts(F)	23	3,94	,45			
Teaching strategies	Arts and Sciences (A)	279	3,95	,44	6,77	,015	A-T F-T F-H
	Theology (T)	92	3,78	,44			
	Health Sciences (H)	10	3,61	,41			
	Fine Arts(F)	23	4,12	,36			
Class management	Arts and Sciences (A)	279	3,97	,48	3,96	,008	A-T
	Theology (T)	92	3,79	,46			
	Health Sciences (H)	10	3,73	,44			
	Fine Arts(F)	23	3,98	,47			
Total score	Arts and Sciences (A)	279	3,94	,37	6,33	,000	A-T
	Theology (T)	92	3,78	,38			
	Health Sciences (H)	10	3,68	,41			
	Fine Arts(F)	23	4,01	,35			

According to Table 4, a significant difference is observed between the self-competence beliefs of pedagogical formation students with respect to the teaching profession including the subscales of ensuring student participation [$F_{(3-400)} = 3.55, p < 0.05$], teaching strategies [$F_{(3-400)} = 6.77, p < 0.05$] and classroom management [$F_{(3-400)} = 3.96, p < 0.05$] based on their faculty of graduation. In other words, the beliefs of pedagogical formation students as to their self-competence with respect to the teaching profession vary significantly depending on the faculty of graduation. Based on the results of the Scheffe test, which was conducted to determine between which groups the varying self-competence perceptions based on faculty of graduation revealed themselves, graduates of the faculty of arts and sciences ($\bar{X} = 3.91$) viewed themselves as more competent in promoting student participation compared to graduates of the faculty of theology ($\bar{X} = 3.77$). At the scale of teaching strategies, arts and sciences graduates ($\bar{X} = 3.95$) viewed themselves as more competent compared to theology graduates ($\bar{X} = 3.95$) and fine arts graduates ($\bar{X} = 4.12$), and more competent than theology graduates ($\bar{X} = 3.95$) and health sciences graduates ($\bar{X} = 3.61$). A comparison of the total mean scores of the scale revealed, in accordance with the results obtained at the sub scale level, that the self-competence beliefs of arts and sciences graduates ($\bar{X} = 3.94$), with respect to the teaching profession, were higher than those of faculty of theology graduates ($\bar{X} = 3.78$).

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were reached, based on the findings obtained from the research.

The belief of self-competence of pedagogical formation students with respect to the teaching profession, together with the scales of promoting student participation, teaching strategies, and classroom management are at a sufficient level. Male students perceive themselves to be more competent at teaching strategies and classroom management than female students do. However, in terms of self-competence beliefs with regard to student participation, female and male students are similar. When considering the overall scores, there was no difference between the self-competence beliefs of male and female students with respect to the teaching profession. Arts and sciences graduates deem themselves more competent than graduates of theology do with respect to the teaching profession in general, including aspects like promotion of student participation, teaching strategies, and classroom management. Fine arts graduates view themselves as more competent at the scale of teaching strategies, which is one of the requirements of professional competence, than did their counterparts in the faculty of theology and the faculty of health sciences.

Classroom management, teaching principles, and methods courses should be given more weight in order to increase the level of belief in self-competence of female students receiving pedagogical formation education with respect to teaching strategies and classroom management.

More applied and practice-oriented educational activities could be provided to faculty of theology graduate formation students on the undergraduate course content they received during their undergraduate education.

The on-the-job training courses, which are to be provided to teachers who take up duty after completing pedagogical training, should be established according to the deficiencies observed in these areas of competency.

References

- Açıkgöz, K. Ü. (2000). *Etkili Öğrenme ve Öğretme*. İzmir: Kanyılmaz Matbaası.
- Allinder, R. M. (1995). An Examination of the Relationship between Teacher Efficacy and Curriculum-Based Measurement and Student Achievement. *Remedial and Special Education*, 247-254.
- Armor, D., Conry-Oseguera, P., Cox, M., King, N., McDonanell, L., Pascal, A., . . . Zellman, G. (1976). *Analysis of the school preferred reading programs in selected Los Angeles minority schools*. Santa Monica, CA: Rand Corporation (ERIC Document Reproduction Service No. 130 243).
- Arslan, A. (2013). Türkçe Öğretmenleri İle Öğretmen Adaylarının Öğretmenlik Mesleğine Yönelik Tutumlarına İlişkin Karşılaştırmalı Bir Çalışma. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, 71-80.
- Ashton, P. (1984). Teachers' Sense of Efficacy: A Self- or Norm-Referenced Construct? *Florida Journal of Educational Research*, 29-41.
- Aydemir, H., Duran, M., Kapidere, M., Kaleci, D., & Aksoy, N. D. (2014). Self-efficacy of teacher candidates intended teaching profession. *Procedia - Social and Behavioral Sciences*, 161-166.
- Bandura, A. (1977). Self-efficacy: Toward a Unifying Theory of Behavioral Change. *Psychological Review*, 191-215.
- Bandura, A. (1989). Human Agency in Social Cognitive Theory. *American Psychologist*, 1175-1184.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, 117-148.
- Bandura, A. (1994). Self-Efficacy. *Encyclopedia of human behavior*, 71-81.
- Bandura, A. (1997). Self-Efficacy. *Harvard Mental Health Letter*, 3.
- Başaran, İ. E. (1994). *Eğitime Giriş*. Ankara: Kadioğlu Matbaası.
- Bergman, P., McLaughlin, M., Bass, M., Pauly, E., & Zellman, G. (1977). *Federal Programs Supporting Educational Change, Vol. VII: Factors Affecting Implementation and Continuation*. Santa Monica, California: Rand Corp.
- Bulut, İ., & Oral, B. (2011). Fen, Edebiyat, İlahiyat ve Güzel Sanatlar Fakültesi Mezunlarının Öğretmenlik Mesleğine İlişkin Öz-Yeterlik Algıları. *İNÖNÜ ÜNİVERSİTESİ EĞİTİM FAKÜLTESİ DERGİSİ*, 1-18.
- Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2010). *Bilimsel Araştırma Yöntemleri*. Ankara: Pegem Akademi.
- Çapa, Y., Çakıroğlu, J., & Sarıkaya, H. (2005). Öğretmen Özyeterlik Ölçeği Uyarlamasının Geçerlik ve Güvenirlik Çalışması. *Eğitim ve Bilim*, 74-81.
- Çelebi, N. (2014). Bir Meslek Olarak Öğretmenlik. *Eğitim Bilimine Giriş* (s. 117-149). içinde Ankara: Nobel Akademik Yayıncılık Eğitim Danışmanlık.
- Çelikkaya, H. (2014). *Eğitim Bilimlerine Giriş Eğitimcilik ve Öğretmenlik*. Ankara: Nobel Yayıncılık.
- Elkatmış, M., Demirbaş, M., & Ertuğrul, N. (2013). Eğitim Fakültesi Öğrencileri İle Formasyon Eğitimi Alan Fen Edebiyat Fakültesi Öğrencilerinin Öğretmenlik Mesleğine Yönelik Öz Yeterlik İnançları. *Pegem Eğitim ve Öğretim Dergisi*, 41-50.
- Gibson, S., & Dembo, M. M. (1984). Teacher Efficacy: A Construct Validation. *Journal of Educational Psychology*, 569-582.
- Gömlüksiz, M. N. (2002). Öğretmenlik Mesleğinin Nitelikleri. *Öğretmenlik Mesleği* (s. 149-167). içinde Ankara: Elazığ Üniversite Yayınevi.
- Guskey, T. R. (1987). Teacher Efficacy, Self-Concept, and Attitudes toward the Implementation of Mastery Learning. *Paper presented at the Annual Meeting of the American Educational Research Association*, 17.
- Gürol, A., Altunbaş, S., & Karaaslan, N. (2010). Öğretmen Adaylarının Öz Yeterlik İnançları ve Epistemolojik İnançları Üzerine Bir Çalışma. *e-Journal of New World Sciences Academy*, 1395-1404.
- Helvacı, M. A. (2010). Eğitim Sisteminde Öğretmenin Rolü. *Eğitim Bilimine Giriş* (s. 285-313). içinde Ankara: Anı Yayıncılık.
- Hoy, W. K., & Woolfolk, A. E. (1993). Teachers' Sense of Efficacy and the Organizational Health of Schools. *The Elementary School Journal*, 355-372.
- Jerald, C. D. (2007). *BELIEVING and ACHIEVING*. Washington, DC: Center for Comprehensive School Reform and Improvement.
- Karasar, N. (2009). *Bilimsel Araştırma Yöntemi*. Ankara: Nobel Yayın Dağıtım.
- Kushner, S. N. (1993). Teacher Efficacy and Preservice Teachers: A Construct Validation. *Eastern Educational Research Association*.
- Küçükahmet, L. (2012). Öğretmen Eğitimi ve Eğitim. *Eğitim Bilimine Giriş* (s. 179-241). içinde Ankara: Nobel Akademik Yayıncılık Eğitim Danışmanlık.
- Morgil, İ., Seçken, N., & Yücel, A. S. (2004). Kimya Öğretmen Adaylarının Öz-Yeterlik İnançlarının Bazı Değişkenler Açısından İncelenmesi. *BAÜ Fen Bilimleri Enstitüsü Dergisi*, 62-72.

- Poulou, M. (2007). Personal Teaching Efficacy and Its Sources: Student teachers' perceptions. *Educational Psychology*, 191-218.
- Protheroe, N. (2008). *Teacher Efficacy: What Is It and Does It Matter?* Alexandria, VA, USA: National Association of Elementary School Principals.
- Ross, J. A. (1994). *Beliefs that make a difference: the origins and impacts of teacher efficacy*. Alberta, Canada: Paper presented at the Annual Meeting of the Canadian Association for Curriculum Studies.
- Ryan, A. M., Kuusinen, C. M., & Bedoya-Skoog, A. (2015). Managing peer relations: A dimension of teacher self-efficacy that varies between elementary and middle school teachers and is associated with observed classroom quality. *Contemporary Educational Psychology*, 147-156.
- Senemoğlu, N. (2012). *Gelişim Öğrenme ve Öğretme Kuramdan Uygulamaya*. Ankara: Pegem Akademi.
- Şahin, A. E. (2009). Meslek ve Öğretmenlik. *Eğitim Bilimine Giriş* (s. 261-307). içinde Ankara: Anı Yayıncılık.
- TDK. (2015, 3 11). *Büyük Türkçe Sözlük*. Türk Dil Kurumu:
http://www.tdk.gov.tr/index.php?option=com_bts&arama=kelime&guid=TDK.GTS.5500af3a3b92d7.04245474 adresinden alınmıştır
- Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: capturing an elusive construct. *Teaching and Teacher Education*, 783-805.
- Wolters, C. A., & Daugherty, S. G. (2007). Goal Structures and Teachers' Sense of Efficacy: Their Relation and Association to Teaching Experience and Academic Level. *Journal of Educational Psychology*, 181-193.
- Woolfolk, A. E., & Hoy, W. K. (1990). Prospective Teachers' Sense of Efficacy and Beliefs About Control. *Journal of Educational Psychology*, 81-91.
- Yılman, M. (2006). *Türkiyede Öğretmen Eğitiminin Temelleri*. Ankara: Nobel Yayın Dağıtım.

Building Resilience Due To Violence: The Struggles Of Mexican Communities

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ABSTRACT

In Psychology the term resilience refers to man's ability to respond to stressful events in a positive manner. Cases of femicide in Mexican society provide significant information regarding the relationship between violence and the development of a capacity for resistance in order to preserve life in the long term. Given that the promotion of empowered actions is closely related with issues of community, power and precariousness, this article will discuss cultural and socio-economic factors in institutional violence against Mexican women and will provide a comprehensive look at a theoretical framework for understanding resilience within this context, starting from the relationship between suffering and vulnerability.

Keywords: Violence, Femicide, resilience communities, Latin America, vulnerability

INTRODUCTION

In the 20th century, Sorel stressed the fact that the concept of violence was far from being fully comprehended (Sorel, 1906). Although not much has changed in this regard, various theoretical and empirical instruments have emerged, thus helping us to better analyze the discourse around violence and to reveal some of its more obscure aspects. A violent state, of which Latin American countries could prove a prime example, can be described as a place characterized by the extreme use of power, force and coercion. Mexico's history is riddled with corruption and structural violence owing to its colonial exploitation in the far 16th century and the capitalistic system imposed on it by the United States. The first factor to consider is its geographical location: situated between the two Americas, Mexico has become increasingly the scene for illegal drug trafficking as well as an attractive setting for international interests. In one hand, violence constitutes the weapon for the citizen who has to resist against a state of corruption and impunity, and on the other hand it seems to be the same instrument that governmental institutions use to defeat drug traffickers. As a result, violence impacts on the well-being of people who live in a state of terror and public insecurity, undermining the role of justice, and producing vulnerability and a sense of uncertainty. The term "legitimized violence" seems appropriate for the Mexican political system, in as much as the state acts within the logic of a "genocidal continuum" (Scheper-Hughes, Bourgoise, 2003), a political practice that creates both visible and invisible violence, legitimizing it into the social system. This situation is evidenced by the sudden increase of homicides, feminicides and kidnappings from 1990 to today, as confirmed by the recent murders of 43 Ayotzinapa students (BBC, 2015). In addition, we have to take into consideration institutional violence, which is manifested in the denial of access to the health system, government measures against border crossing and the exploitation of victims. The situation became more dangerous as a result of the political efforts of the U.S.A. to control the border zone and to eradicate illegal immigration and drug trafficking. In this regard, prime examples are Tijuana and Ciudad Juárez, two border towns in which violence has reached levels of emergency to the point where they are internationally renowned, and have thus been extensively researched. The aim of this article is to bring to light the non-violent protective measures adopted by communities by means of an interdisciplinary method focused on suffering and resilience. In Ciudad Juárez, as a result of the increase in the rate of femicide, mothers of the victims began to protest in earnest, joining the Nuestras Hijas de Regreso a Casa A.C. (May our Daughters Return Home, Civil Association) protest movement. These events had such an impact that they gave birth to actions against corruption, double victimization and the Mexican government's legitimacy. Furthermore, following the Merida Initiative, stipulated by former Mexican President Felipe Calderon and former U.S.A. President Georg Bush in 2008, the political strategies against the drug war became more violent and aggressive, resulting in an increase of victims and an alarming lack of justice within the administration. Both Mexico and America violate the law, breach security and infringe on human rights. As a consequence, the connection between power and violence creates issues related to the sense of recognition of human being, the legitimacy of safeguarding the right to live without violence and the assertion of a policy based on vulnerability and control. How can we react against violence without responding with violence? Following the example of Gandhi's powerful strategy of non-violent resistance, we believe that Mexican citizens have developed a very successful capacity for resistance through empowerment, which contributes to building a force called resilience.

CONCEPTUALIZING VIOLENCE AND VULNERABILITY

In ‘On Violence’ Hanna Arendt summarizes her considerations on violence suggesting an examination of its roots and nature (1966, p. 243), at which point explaining such a phenomenon by assigning it into the sphere of power would be reductive. What perhaps eludes Arendt’s evaluation on the nature of violence is the cultural context as a root of its development. Gender-based homicide ranks as one of most extreme uses of violence as it is considered the norm and constitutes a social practice carried out through the use of physical, psychological and socially destructive methods. The presence in society of a violent attitude cannot only be explained by its relationship with power, as the power itself acts primarily in the cultural context where the process of encoding and decoding is constructed, deconstructed, fought and burned. Firstly, we will review theories that show the normative use of the term violence, so that violence is not an instinctual act, but rather a product of an ideological construction. Moreover, we will evaluate the bond between violence, vulnerability and resilience within the context of the struggles in Mexican society. Capacity for resilience is analyzed through interdisciplinary theories based on psychology, philosophy and cultural studies which are channeled into a strong political message that promotes empowerment. Resilience is therefore a fundamental factor in helping people to overcome traumatic events during their lives. In addition, the community’s capability to manage bereavement and complicated events depends on social, environmental and cultural factors. Also, building resilient communities is a relevant protective factors that needs deep reflection and a critical evaluation. According to Hall (1980), who redefines the concept of “hegemony” developed by Gramsci (1971), the cultural dimension is understood as the battleground where power is disputed. For this reason, he appeals for the need to “deconstruct the culture” (Hall, 1980), the place where the battle for power is fought, won and lost and where awareness is created through policy. The author states that this battleground is the popular culture, which is a “contradictory space”, a “negotiation space” where dominant and subordinate groups fight against each other to establish hegemony (Hall, 1980). Similarly, violence is combated in the cultural sphere, and its recognition depends on the success of one of the two groups and on the political and economic role that the state has in the world. Power creates and modifies what can and what cannot be considered violence because it conditions the collective, supported by a ‘nested doll principle’. As a result, social phenomena, such as stereotypes and prejudice, allow violent measures and conceptualize it against the understanding of sexuality, race and class. Consequently, sexual, racial and class-based discrimination has become a cultural and biological matter carried out by political and religious powers and whose terminal point flows into the legitimate use of violence, embodied by cases of kidnapping, homicide and femicide. The latter term refers to a form of physical, moral and psychological crime which includes all instances of violence against the female gender, such as rape, sexual violence, violence caused by laws related to the defense of honor or the right of dowry, and violence committed by intimate partners, by family members or strangers. Many activists, researchers and scholars have contributed with their research to give a legitimate definition of this phenomenon. This term was mentioned for the first time by Diana Russell (1976) who presented an international report on crimes against women to the Court of Brussels. However, a first definition was formulated in the work *Rape in Marriage* (1990) in which are collected the testimonies of 930 women living in San Francisco, all victims of rape and abuse within their marriage. In this book femicide is defined as the hatred towards women only because they belong to the female gender (Russell, 1990). The desire of man to subdue and control the female gender through the use of violence is a practice of terror that begins with an absolute submission and degenerates to complete destruction. As suggested by the anthropologist Marcela Lagarde, this connection between violent control and domination of the woman is based on the political and Judeo-Christian ideologies settled in the cultural space (Lagarde, 2011). Such reality attempts to redefine violence against women within a political and cultural framework as a consequence of human behavior. Cases of femicide in Juárez represent the manifestation of the ideological dominance of patriarchal hegemony and the use of terror as a political tool transferred to the culture. This interpretation suggests the inexorable triumph of phallocracy through a policy of “genocidal continuum” (Scheper-Hughes, Bourgoise 2003), and so violence is continuous, cyclical and reproducible. The word genocide refers to those crimes that are committed in social spaces, such as schools, hospitals, nursing homes, prisons and courts, places where the absence of any kind of violence should be ensured. Furthermore, Scheper-Hughes distinguishes visible violence, such as harassment, abuse, kidnapping, torture and infliction of pain, from invisible violence practiced in supposedly safe institutional spaces (e.g., hospitals and nursing homes). According to the author, invisible violence is structural because it is represented by poverty, hunger, social exclusion and humiliation, which inevitably gets translated into intimate and domestic violence (2003). Structural violence is therefore embedded into institutions and it cannot be promptly perceived. Otherwise, the continuum alludes to the human capacity to act with a type of violence that bestows upon victims a status of non-persons. The consequences of physical, psychological and sexual violence are irreversible. It dramatically dehumanizes and depersonalizes the victim, causing social exclusion and psycho-physical disturbances quite similar to the symptoms of Post-Traumatic Stress Disorder (Herman, 1992). Perhaps, it is a form of terror that echoes in everyday life and manifests itself in the public and private spheres. These realities transform legislation related to violence, so that it becomes a structural metaphor for an institutional policy of terror, forcing people to live in precariousness as well as suffering.

With regard to the studies on violence against women, the cultural method emphasizes the bond between aggressive human behavior within the logic of power and social manipulation explained through a feminist perspective. In this scenario vulnerability is the human condition caused by practices of socialization, which are legitimized and regulated by the state. In addition, it should be inferred that the presence of violence in public and private spheres is simply the product of a political governance established by the organs of power. The community perceives violent acts as being necessary, justifying them as lawful actions which are socially required. In this context, emotional manipulation plays a central role in the somatic dimension, in which the physical pain inflicted on the victim causes psychological vulnerability. According to Judith Butler (2004), the human body belongs to the social sphere because of its political constitution. With regard to the recognition of life, we should consider its precariousness caused by the exposition to violence. Psychological and physical vulnerability is part of our sociability, and so we live in a state of subjection (Butler, 1997). The term subjection indicates that our life is dominated by an external political power. Following Althusser's (1970) definition of interpellation and *assujettissement*, Butler argues that we are subordinate to a normative system of control and manipulation, so that power acts on us defining our needs, desires and ideas about the world and about ourselves. The practice of power, understood as the control of men over men, follows the Hegelian theory of recognition in which a human being recognizes itself as a subject through the judgment of others. This process of self-consciousness generates the master-slave dialectic, a kind of relationship that establishes the nature of power. As a consequence, we are the product of this dialectical relationship between power and identification, which clarifies our inevitable embodiment with power. Such a concept is discussed in Foucault's work, the *maitre a penser* of contemporaneous human science. In his work *Discipline and Punish* (1975) he proposes an analysis of our society through the study of those systems of punishment that have been sanctioned by a specific "political economy" of the body, in which institutional powers flow into the body, owning it. The author underlines the need to unmask the "micro power" through the knowledge of those historical events which have favored the political hegemony of the social body, both in the collective and in the individual. The result of this process is defined by the term "biopolitics" or "biopower" (Foucault, 1975-76), i.e., the invasion of institutional powers and ideologies over physical human beings with the purpose of bringing hegemony to it. Finally, it forces us to live in a state of vulnerability, so that the political system creates a norm for the recognition of human life, declaring one life as "grievable" and not the other (Butler, 2004). A re-evaluation of the meaning of both vulnerability and pain could be a good way of re-politicizing violence. If victims learn to take advantage of the force of suffering, they can use it as political force for empowerment, forming a multi-level recognition of identity through the unmasking of political constructions of violence and halting the process of re-victimization.

RESILIENCE

Resilience is a term that in physics refers to the capacity of an object to resist against external powerful stimulation without breaking (Oxford Dictionary, 2015). It has since taken on different meanings in various fields, such as in ecology, engineering, computer science and psychology. Consequently, when research in psychology promoted the focus on positive psychology, its meaning was shifted both to the words resilience and recognition with eudemonic response (Keyes, 2007). The concept of eudemonia is an Aristotelian term which means happiness, and it refers to the human practice of flourishing within a socio-emotional context. For positive practice purposes, social science has adopted the term resilience with a eudemonic approach to define the human capacity to react in a positive way against adverse circumstances. According to Bonanno (2004), resilience is "*the ability of adults in otherwise normal circumstances who are exposed to an isolated and potentially highly disrupt event, such as death of a close relation or a violent or life-threatening situation, to maintain relatively stable, healthy levels of psychological and physical functioning*" (2004, p. 20). Moreover, within the concept of resilience the concept of empowerment is stressed: a process which aims for the acquisition of agency (Rappaport, 1977). In psychology, many resilience models have been developed to show how this process works and most of these privilege factors such as personality, educational systems, family and the social environment. One of the most well-known was proposed by Gilligan (1997) who stated that resilient operations rely on the good responsiveness constituted by a secure emotional base, self-confidence and emotional self-efficacy (1997, pp. 22-23). These three factors are focused more or less on the individual capacity.

Alternatively, there are other models, such as the ecological model that considers different protective factors and promotes the cultural and environmental influence for tolerating stressful events. Bronfenbrenner (1996) argues that building resilience is an interactive process constituted of different systems, such as microsystems (the family atmosphere), mesosystems (relationship with peers, teachers), exosystems (Social setting, community), macrosystems (culture) and chronosystems (socio-historical circumstances), (1996, pp. 39-40). Furthermore, the ecological model privileges the relevance of culture, and the number of different ways for a community to overcome vulnerable situations and to understand what a resilient action constitutes as opposed to one that is not. The cultural and social determination of resilience offers a wide and complex key for the interpretation of problems that cannot avoided, considering the individual and collective interaction inside a troubled community. The capacity to react positively, linking positive emotions with the force of adjustment, is character-building for

victims who undergo a transformation process until eventually succeeding. However, in psychology some methodological problems exist relating to the concept of positive mental health and resilience. They concern the measurement of resilience factors, because in most cases to be resilient means the absence of depressive disorders or psychopathological disturbances after a traumatic event (Bonanno, 2009). In this article, we do not discuss such scientific gaps. Rather we focus on the link between vulnerability and resilience as important an issue connected with empowerment capabilities. We believe that victims, through a re-evaluation of suffering and a politicization of vulnerability, are able to reinterpret the dimension of symbolic violence which are culturally connected, and to re-establish non-violent social practices.

MEXICAN RESILIENT COMMUNITIES

Mexico has a long history of violence and corruption, and its society has long been living in pain, suffering as well as emotional and mental distress. Over the past two decades, the number of victims has grown dramatically and due to the lack of justice, people have begun to adopt a powerful civic response, creating a unified social bond against criminality. This initiative was taken up by the victims themselves, who formed social movements demanding effective response by the government and the implementation of a security system. The most famous action arose in highly dangerous places along the border, in cities such as Ciudad Juarez. Since 1990, this border town has been afflicted by the kidnapping and murder of women, called feminicide. There are a variety of aspects that expose the citizens of Ciudad Juarez to such criminal development. This area has become a crime scene due to its geographical position, the increase of urbanization and migration, the installation of international industries *maquiladoras* and the presence of narco-trafficking, known as *el Cártel de Juarez* (Fragoso, 2000). After the shocking revelation of desert deaths in the Lote Bravo, Lomas de Poleo, Cotton filed and Cristo Negro areas, there have been no positive resolutions to the cases of feminicide and the crimes still remain uninvestigated and unpunished. Such impunity motivated the victims to become aware of this exploitation and to promptly search for the truth themselves. In 2001, the mothers of the murdered women founded the civil association *Nuestras Hijas de Regreso a Casa* with the purpose of fighting through civil engagement against impunity and corruption. These mothers and relatives are unified by the desire for justice and the will to release their murdered daughters from the deprivation of their human rights. This association offers moral and legal support to the victims of kidnappings and feminicide, with the goal of fighting for justice and protecting human rights, as well as avoiding double victimization from the authorities. The organization *México Unido Contra la Delincuencia* (Mexican United Against Crime, MUAC) has a similar background, as it was founded after the kidnapping of Raul Nava on 6th May 1997 and found dead six months later (Amnesty International, 2010). Despite some accusations against this organization and its implication in scandals, its work is significant as an example of civil empowerment. The MUAC has promoted several marches, such as the “Let’s rescue Mexico” march that took place in 2004 in Mexico City, which had the aim of encouraging victims to demand justice and of attacking the authorities for lack of security (Villagran, 2014). Other cases of parents who have shown resilient capacity after the loss of their daughters and sons could be illustrated through the actions of Isabel Miranda de Wallace, founder of the *Asociación Alto el Secuestro*, the *Foundacion of Mexico SOS* promoted by Alejandro Martí, the *Movimiento por la Paz con Justicia y Dignidad* formed in 2011 by the poet Javier Sicilia and the *Fuerzas Unidas por Nuestros Desaparecidos y Desaparecidas en Mexico*. These are movements which strive to unite victims and to encourage the creation of a network for fighting against organized crime, asking for justice and punishment, supporting the respect of human rights and civil protection. The work of these numerous civic organizations is relevant because they identify themselves as a heterogeneous community unified in the same suffering. Victim is a word of the collective memory, and through this term people have built psychological and political capacities for resilience. On the other hand, the focus on vulnerability, i.e. the psychological and mental precariousness of a human being, and on resilience, as the ability to afford and change distress, link from the individual to the collective experience, and is eventually translated into community resilience. Adger (2000) previously defines the term of community resilience as “*the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change*” (Ibid. 2000, 350). That means that resilience is the ability to act against vulnerability. With regard to Mexican movements, resilience emerges as the shared abilities to overcome trauma and violent situations, whilst gaining empowerment through communication, self-organization and social union. Even if these organizations began to enforce the impunity system because of personal tragedies, entire communities would join to them in fighting for the same cause, i.e. claim the right to be recognized as human beings, reporting the violation of fundamental rights and accusing the Mexican government for being corrupt and unequal. The solidarity around social exploitation is one of the basic attributes to building resilient communities. In addition, social unification can be translated into the building of social capital as an aspect that ensures flexible and resistant relationships based on trust and transformative capacity. Considering Oxley’s qualitative approach (as cited in Frankenberg, Mueller, Spangler, Alexander, 2013) by the measurement of community resilience, we show that Mexican communities act in a resilient manner, re-politicizing their recognition through suffering. As Oxley states, they show ‘preparedness’ in perceiving the risk and for coping with trauma; ‘responsiveness’ in protecting the victim

and working on their behalf with legal, social and health initiatives; ‘learning and innovation’ referring to the ability to be flexible and innovative, and transforming mistakes or difficult conditions into instrumental growth; ‘memory’ with regard to the sharing of the same history of Hispanic colonization and capitalistic exploitation, a past that reconstructs Mexican identity on the basis of victimization and deprivation of their religion, language and tradition. The common status provides force and the ability to fight for the same rights; ‘self-organization’, i.e. the ability to rely on own capacities without any institutional, economical, financial and legal support; ‘diversity’ alludes to the existence of different resilient responses from individual to collective, including the different ways of control distress on a physical, emotional and psychological level; ‘inclusion’ means the creation of a cohesive and cooperative community formed by different members; ‘aspirations’ includes the same goal and a common vision of the future that people unanimously have.

CONCLUSION

The question surrounding violence needs an analysis through an interdisciplinary perspective under the lens of cultural studies. This is a field that is connected to human rights discourse and praxis including feminist and psychological theories. The central aim of this contribution is to examine the relationship between vulnerability and pain as a process that generates resilient force. In this regard, Stuart Hall’s invitation to investigate ideas of justice and agency into a cultural dimension suggests we focus on the struggles evident in cases of feminicide. This is suggested due to the effectiveness of women-led movements. In these cases, Mexican communities began to react against violence following the example of Ciudad Juárez’s initiative after its cases of feminicide. After a long history of exploitation and colonization, Mexican people have reached the capacity for using their suffering as a weapon to reconstruct their identity. Our aim is not only to question violence, but rather to start from this point with the intention of showing the efficacy of resilience. Principally, in psychology the capacity to cope with adverse events is related to individual factors, whereas the ecological view promotes the cultural and environmental dimension, underlying the bond between outside/inside factors. On the one hand, theories from psychology are useful for scientifically explaining how people adopt resilience and how it can be observed through measured parameters. On the other hand, we argue that an interdisciplinary work is fundamental in understanding complex relations between violence and resilience, keeping in mind the strong relationship between policy, body discipline, culture and ideology, and violence, vulnerability, empowerment and resilience. Considering the bond between these factors, we argue that violence and resilience coexist in a dialectical relationship, in which they interact simultaneously (Cirami, 2014b). Focusing on the dialectic meaning, the search for truth about violence ensures that the political use of such opposing forces determines the affirmation of one above the other. The instrumental use of these coexisting forces is embedded in structural, social, cultural and political dimensions, so that in the context of high levels of crime and persisting violence, people learn to manage them. The high levels of illegality can reproduce negative social reactions, such as narco-trafficking, kidnapping, criminal social practices, as a means of instinctive defense and survival. Otherwise, violence becomes an instrument of cohesion, building social trust and civil engagement which gives rise to resilient capability. This is to say that stressful situations produce a kind of agency, i.e. the capacity to engage into the social structure, through resilient force generating a resilient agency (Cirami, 2014b). According to Sampson (Sampson et al. 1997), collective efficacy is more stable and increased in such emergency contexts where the community resilience flourishes on a structural and social level. When structural corruption concerning employment, education, inequality, urbanization and health treatments persists, it directly produces violence, represented in physical, emotional and psychological contexts. Nowadays, violence still keeps threading through society and justice or human rights seem to be reverberating sounds in everyday life. The mass kidnapping of 43 male students that occurred last September in Mexico’s Guerrero State remind use how brave, unified and determined the Mexican community is. All walks of life protested against this state of terror, sharing the pain, the suffering and the indignation of the victims’ parents. The slogan “*Todos somos ayotzinapa*” (“We are all ayotzinapa”), was embraced worldwide, and was adopted by supporters of justice, human rights and of freedom from violence. Protests and resistance actions have been an essential instrument in contributing to the unmasking of state guilt. Even if a way of finding an efficient cure for the metastasis of violence is very difficult and requires co-operation, obstinacy and love for the search of truth, resilient capacity still remains the best antidote for fighting against the uncontrollable raging hunger for the domination of men over other men.

References

- Adger, W. N. (2000). *Social and ecological resilience: Are they related?* In *Progress in Human Geography*, 24 (3), 347-364. Retrieved from https://groups.nceas.ucsb.edu/sustainability-science/2010%20weekly-sessions/session-102013-11.01.2010-emergent-properties-of-coupled-human-environment-systems/supplemental-readings-from-cambridge-students/Adger_2000_Social_ecological_resilience.pdf
- Amnesty International. (2003). *Mexico: Intolerable killing: 10 years of Abductions and Murder of Women in Ciudad Juárez and Chihuahua: Summary Report and Appeals Cases*, 2003. Retrieved from <http://www.amnesty.org/en/library/info/AMR41/027/2003>

- Ibid. (2010). *Mexico: Human Rights defender at risk after killing*. Retrieved from <http://www.amnesty.org/en/library/info/AMR41/005/2010>
- Althusser, L. (1970). *Lo Stato e i suoi apparati*. Roma: Editori Riuniti, 1997.
- Arcuri, L., Cadinu, M. R. (1998). *Gli Stereotipi. Dinamiche psicologiche e contesto delle relazioni sociali*. Bologna: Il Mulino.
- Arendt, H. (1970). *On Violence*. New York: Harcourt, Brace and World
- BBC News, (9 October 2014). *Mexico missing students: Nationwide protests held*. Retrieved from <http://www.bbc.com/news/world-latin-america-29538079>
- Bonanno, G. A. (2004). *Loss, trauma and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events*. In *American Psychology*, 59, 20-28.
- Bonanno, G. A. (2009). *The Other Side of Sadness: What the New Science of Bereavement Tell Us About Life after Loss*. New York: Basic Books.
- Bonanno, G. A., Westphal, M., Mancini, A.D. (2011). *Resilience to Loss and Potential Trauma*. In *Annual Review of Clinical Psychology*, 7, 511-535. Retrieved from <http://www.annualreviews.org/> DOI: 10.1146/annurev-clinpsy-032210-104526
- Bourdieu, P. (1998). *Il dominio maschile*. Milano: Feltrinelli, 2009.
- Bourgoise, P. (2001). *The power of violence in War and Peace*. Retrieved from <http://philippebourgois.net/Ethnography%20Power%20of%20Violence%202001.pdf>
- Butler, J. (1997). *La vita psichica del potere. Teorie della soggettivazione e dell'assoggettamento*. Roma: Meltemi, 2005.
- Ibid. (2004). *Precarious Life. The Power of mourning and violence*. London, New York: Verso. Retrieved from <http://programaddssr.files.wordpress.com/2013/05/butler-judith-precarious-life.pdf>
- Ibid. (2009). *Frames of War. When is Life Grievable?*. London, New York: Verso. Retrieved from <http://humanities.wisc.edu/assets/misc/Butler.pdf>
- Bronfenbrenner, U. (1994). *Ecological models of human development*. In *International Encyclopedia of Education*, V.3, Ed. Oxford: Elsevier, 37- 43. New York: Freedman. Retrieved from <http://www.psy.cmu.edu/~siegle/35bronfenbrenner94.pdf>
- Caputi, J. (1987). *The Age of Sex Crimes*, Ohio: Bowling Green State University Popular Press.
- Caputi, J., Russel D. E.H. (1990). *Femicide: speaking the unspeakable*. Retrieved from <http://www.unc.edu/~kleinman/handouts/Femicide.pdf>
- Cirami, F. (2013). *Gender Violence: Social Structure in Latin America, the question of victim and trauma*. In *The International Journal of Humanities and Cultural Studies*, 1, April-June 2014, 1-15, doi: 10.4399/978885487323013
- Cirami, F. (2014a). *La crisi strutturale in America Latina: olocausto femminile a Ciudad Juarez*. In *Razzismo, xenofobia, esclusione sociale*, 263-291, Roma:Aracne Editrice, doi: 10.4399/978885487323013
- Cirami, F. (2014b). *La forza politicizzante del dolore: le resilient communities in Messico*. In *Elephant & Castel*, 10, 5-30.
- El Colegio de México (COLMEX). (2010). *Los Grandes Problemas Nacionales. Seguridad nacional y seguridad interior*. Retrieved from www.colmex.mx/
- Foucault, M. (1975-76). *Society Must be Defended. Lectures at the College de France, 1975-76*. Retrieved from http://rebels-library.org/files/foucault_society_must_be_defended.pdf
- Ibid. (1978-79). *Nascita della biopolitica, Corso al Collège de France, 1978-79*. Milano: Feltrinelli, 2007.
- Frankenberg, T., Mueller, M., Spangler, T., Alexander, S. (2013). *Community Resilience: Conceptual Framework and Measurement: Feed the Future Learning Agenda*. Rockville, Md: Westat. Retrieved from http://agrilinks.org/sites/default/files/resource/files/FTF%20Learning_Agenda_Community_Resilience_Oct%202013.pdf
- Fragoso, J. M. (2000). *La Cultura del Femicidio en Ciudad Juarez, 1993-1999*. Retrieved from http://www.womenontheborder.org/sex_serial_english.pdf
- Gelli, B. (2009). *Psicologia della differenza di genere. Soggettività femminili tra vecchi pregiudizi e nuova cultura*. Milano: FrancoAngeli.
- Gilligan, R. (1997). *Beyond Permanence? The importance of Resilience in Child Placement Practice and Planning*. In *Adoption and Fostering*, 21, 10-21. Retrieved from www.aaf.sagepub.com doi: 10.1177/030857599702100104
- Gramsci, A. (1971). *Quaderni del carcere*. Roma: Editori Riuniti.
- Hall, S. (1980). *Cultural Studies: due paradigmi*. In *Il soggetto e la differenza*. Roma: Meltemi, 2006, 77-98.
- Herman, J. L. (1992). *Trauma and Recovery: The Aftermath of Violence from Domestic Abuse to Political Terror*. New York: Pandora-Basic Books, 2001.
- Keyes, C. L. M. (2007). *Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health*. In *American Psychologist*, 62, 95-108.
- Malaguti, E. (2005). *Applicazioni teoriche della resilienza*. In Cyrulnik, B., Malaguti, E, (Eds) *Costruire la*

- Resilienza: la riorganizzazione positiva della vita e la creazione di legami significativi*, 79-102. Cardolo: Erikson.
- Lagarde, M. (2011). *Los cautiverios de las mujeres: Madresposas, monjas, putas, presas y locas*. Madrid: Horay HORAS Editorial.
- Luther, S.S., Cichetti, D., Becker, B. (2000). *The Construct of Resilience: A Critical Evaluation and Guidelines for Future Work*. In *Child Development*, 71, 543-562, May/June 2000. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1885202/> DOI: 10.1111/1467-8624.00164
- Organización Panamericana de la Salud. (2013). *Violencia contra la Mujer, en America Latina y en el Caribe*. Retrieved from <http://www.paho.org>
- Oxford Dictionary, (2015). Retrieved from <http://www.oxforddictionaries.com/>
- Rappaport, J. (1977). *Community Psychology. Values, research and action*. NY: Riehart & Winston.
- Russell, D. E.H. Ibid. (1990). *Rape in Marriage*. Bloomington: Indiana University Press.
- Ibid. (1992). *Femicide: The politics of Woman Killing*. New York: Twayne Publishers. Retrieved from http://www.dianarussell.com/articles_and_books_online.html
- Russell, D. E.H., Van de Ven, N. (1976). *Crimes against woman: Proceeding of International Tribunal*, 1990. Retrieved from http://www.dianarussell.com/f/Crimes_Against_Women_Tribunal.pdf
- Rutter, M. (2006). *Implications of Resilience Concepts for Scientific Understanding*. In *Annual New York Academy of Sciences*, 1094, 1–12. Retrieved from http://www.tacorec.org/materiais/nyas_resilience_rutter_2006.pdf doi: 10.1196/annals.1376.002
- Ibid. (2012). *Resilience as Dynamic Concept*. In *Development and Psychopathology*, 24, 335–344. Cambridge: Cambridge University Press. Retrieved from <https://www2.viu.ca/resilience/documents/Resilienceasdynamicconcept.pdf> doi:10.1017/S0954579412000028
- Sampson, R. J., Raudenbush, S. W., Felton E. (1997). *Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy*. In *Science* 227, 15, 918-924. Retrieved from <http://www.d.umn.edu/~jmaahs/MA%20Theory%20Articles/Sampson%20et%20al%20collective%20efficacy.pdf>
- Scheper-Hughes, N., Bourgoise, P. (2003). *Violence in War and Peace: An Anthology*. San Francisco: Wiley-Blackwell.
- Sorel, G. (1908). *Reflections on Violence*, 2004. Retrieved from <http://libcom.org/files/Sorel-Reflections-on-Violence-ed-Jennings.pdf>
- Villagran, L. (2014). *The Victims' Movement in Mexico*. In *Building Resilient Communities in Mexico: Civic Responses to Crime and Violence*, 121-141. Retrieved from <http://www.wilsoncenter.org/publication/resilient-communities-mexico-2014>

Burnout Levels In Physiotherapist Working In Hospitals

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ABSTRACT

Background: Physiotherapists are exposed to emotional and physical burdens that often lead to a state of Burnout. Objectives: To determine the prevalence of burnout rates in physiotherapists. Methods: Cross-sectional descriptive and correlational study with 85 physiotherapists, whom we applied a socio-demographic questionnaire, the scale of positive and negative affections on personality of Eysenk, the scale of Job Satisfaction and the Inventory of Maslach Burnout (MBI). Results: 84% are women with a mean age of 39. 45% exhibit moderate exhaustion. Conclusion: The prevalence of burnout among physiotherapists is high. Affective balance, neuroticism and job satisfaction are predictive factors.

INTRODUCTION

Health is a key factor for life and promoting well-being, working capacity and personal happiness. Professional, social, environmental and psychological variables have recently been valued in health measurement (Bennet & Murphy, 1999) cited by Gonçalves (2008).

Work has acquired social relevance at times neglecting proper conditions, resources and appropriate job posts tailored to the characteristics of the people, their needs, skills, interests, emotional, social and family components with repercussions to the individual, organizations and society in general on the physical, psychological and behavioural levels, (European Agency for Safety and Health at Work in <https://osha.europa.eu/pt/front-page> consulted on 15 September 2013). Thus, there was an intention to study burnout syndrome in physical therapists working in Regional Health Administration hospitals in the central region of Portugal.

For Seabra (2008), the burnout syndrome is “an experience of physical, emotional and mental exhaustion caused the long-term involvement in situations that are emotionally demanding.” The physiotherapist deals with the pain and suffering of patients and families daily and is often susceptible to stress (Vital, Baltazar, Gavinho, & Mendes, 2006).

“Health is not an absolute quality. It has the value given to it by the culture of society” and for Reis (2000), cited by Mendes (2008), it is the highest level of well-being, functional capacity, and intervention capacity achieved by each of us and by the community, valuing our own potentialities the most and lucidly facing our own limitations and constraints (psychological and biological), as well as environmental limitations and constraints (community and ecological) of the ecosystem which surrounds us.

Burnout: It is during the 70s in the United States of America (USA) that there is a wake-up call to the fact that the burnout phenomenon does not involve the “aberrant” behaviours of some individuals considered “deviant” but rather is a more common phenomenon, characterized by emotional exhaustion and loss of motivation and commitment.

The term stems from popular culture and not from academic origin. It is the result of a work of fiction, “The Burnout Case,” where a spiritually tormented and disillusioned architect quits his job and goes to an African jungle. Health professionals are prone to burnout (Mateen, 2009).

In any profession, stress can have positive aspects that challenge us, and allow us to evolve personally and professionally as well as negative aspects which place obstacles in our way and deteriorate our attitude with regards to work over time with impacts on our mental and physical health. (Seabra, 2008) considers it “an experience of physical, emotional and mental exhaustion caused by long-term involvement in situations that are emotionally demanding.” It is a psychological syndrome involving prolonged responses to stressors in the workplace. It involves chronic stress resulting from a mismatch between the individual and the work (Maslach, 2003) cited by Seabra (2008). Burnout is a social problem identified by commentators and social workers long before becoming a focus for researchers, (Maslach et al., 2001; Maslach, 2003) cited by Seabra (2008).

According to Mateen (2009), the concept of burnout is a psychological syndrome in response to chronic interpersonal and emotional stressors at work. The three dimensions of these responses are a choking exhaustion, a feeling of cynicism and detachment from work and a feeling of inefficiency and lack of personal

accomplishment.

Today there is a consensus that burnout is a chronic and multidimensional experience of stress at work, although some authors address it as one-dimensional. The burnout syndrome for David and Quintão (2012) is a psychosocial syndrome assumed as a response to chronic emotional and interpersonal stressors.

Job satisfaction: This concept is not consensual. The first studies on this topic were carried out within the field of psychology. It is based on the satisfaction obtained from any experience and depends on expectations, needs and values. For the author, expectations affect attitudes because there is a greater or lesser discrepancy between what one wants and what one has. Thus, values, unlike needs, are something that are acquired by the individual and that may be desired by him consciously or unconsciously. It is what is sought and which conditions choices and emotional reactions. Job satisfaction results from the perception that the individual has about their work and its value to the extent that they are consistent with their needs, (Dias, 2009). According to Rodrigues (1995) cited by Borges and Daniel (2009), the importance of job satisfaction is notorious as it represents an “indicator of the perception that individuals have between what are the expectations with regards to work and what are the intrinsic or extrinsic rewards effectively taken from these situations, capable of revealing the feelings of personal achievement and participation in the system through work.”

For Dias (2009) whether the work is a utility, a need, an obligation or a source of satisfaction, it represents, regardless of individual perception, a fundamental dimension of life in modern societies. Its centrality derives not only from the impact it has on workers' behaviour, but also in job satisfaction and is one of the three most important predictors of well-being, along with marriage and satisfaction with the family. The relationship between performance and job satisfaction is clear, but there are two opposing explanations for this. The first refers to will the satisfaction resulting from performance; that is, when people like their work, they will strive more and as a consequence will perform better. In the second, performance results in satisfaction; that is, when people perform well, they tend to benefit and the benefits may increase satisfaction, and satisfaction favours the state of mind and positive attitudes at work and in private life. Dissatisfaction correlates directly with various psychosomatic problems, such as stress, problems of conduct at work, absenteeism and lack of punctuality, (Costa et al., 2008).

THE STUDY

Our research questions are: (i) “what is the prevalence of burnout in physiotherapists working in the Centre-RHA hospitals; (ii) what socio-demographic and professional factors influence burnout syndrome in physiotherapists in their workplace; (iii) what is the influence of psychological variables on the onset of burnout syndrome in physiotherapists working in Centre-RHA hospitals.

The aims are: to determine the prevalence of burnout in physiotherapists working in Centre-RHA hospitals; to identify socio-demographic and professional variables that influence physiotherapist burnout syndrome and to evaluate the influence of psychological variables on the onset of burnout in physiotherapists.

This is a cross-sectional descriptive correlational and analytical study. A questionnaire to obtain socio-demographic and professional data was applied, as well as the Satisfaction at Work Scale and the Maslach Burnout Inventory (MBI) to a convenience sample consisting of 85 physiotherapists working in the Centre RHA hospitals.

The statistical descriptive and analytical or inferential statistics were used for data analysis.

FINDINGS

Physiotherapists have an average age of 39 years, 16.47% of the entire sample is male and 83.53% are female. Of the 85 physiotherapists who participated in the study, 31.8% are aged 33 or less, 32.9% are between 34 and 43 years old and 35.3% 44 or older. Between gender and age groups the adjusted residuals do not show statistical significance. Most physiotherapists are married (56.5%), followed by 43.5%, single/divorced/separated. There are no significant differences in relation to marital status. 68.2% have a bachelor's/honours degree and 31.8% hold a of post-graduate degree, a master's degree or a doctorate, with no significant difference in relation to gender. The mean length of professional experience is 15.92 years, with 34.1% exercising the profession for 12 years or less; 31.8% of the sample between 13 and 19 years and finally 34.1% for 20 or more years. Length of service in the institution is on average 12.54 years. Most respondents, 56.5%, are civil servants and the remaining 43.5% have a contract relationship with the institution. 65.9% perform 35 hours of weekly work and 34.1% perform 40 hours a week. 89.4% of the physiotherapists perform duties related to patient care and 10.6% work in management/coordination.

Job satisfaction: The values range between 12 and 35 with a mean of 24.98 and standard deviation of 5.04 with differences which are not statistically significant. The results show that 62.4% are satisfied with their work and of these 84.9% are women. Of the 37.6% who are dissatisfied about 8 out of 10 are women, with no statistically significant differences. The highest degree of satisfaction (39.6%) is found in older physiotherapists. Those aged 33 or less and 34 to 43 have equal percentages (30.2%). The adjusted residuals and the chi-square test did not show statistical significance ($\chi^2 = 1.181$; $p = 0.554$). The marital status variable was also not found to have a

moderating effect in relation to burnout.

Among the dissatisfied the largest percentage (59.4%) is among those who cohabit with a partner. Those cohabiting with a partner were also found among the group of the satisfied. There was a slightly lower percentage (54.7%) in this case, without statistical significance ($\chi^2=0.176$; $p=0.675$).

The most satisfied have been working for more years (37.7%) and as civil servants (60.4%). Among the dissatisfied, half are civil servants and the other half have a contract with the institution, without statistical significance for length of service and institutional bond, respectively.

Burnout syndrome: The statistics indicate a minimum rate of exhaustion of 0 and a maximum of 25 with a mean of 11.82 (± 6.38). As for cynicism, the minimum and maximum values found respectively were 14 and 36 with a mean of 29.42 (± 4.94) and moderate variation coefficient of 16.7%. With regards to effectiveness the minimum and maximum values range from 0 to 29 and the mean is 10.22 (± 6.62) with a high variation coefficient (64.7%). Most of sample exhibits moderate exhaustion and approximately four in ten, high exhaustion.

Older and married women suffer from greater exhaustion than men, without statistical differences. Those with up to 12 years of service, have a higher percentage of moderate (42.1%) and high (35.5%) exhaustion. The chi-square test revealed statistical significance among participants with moderate exhaustion and between 13 and 19 years of service, as well as those with high exhaustion and over 20 years of service. Low and high exhaustion appears in civil servants, while moderate exhaustion is found among participants under contract, with statistical significance.

Note that none of the study participants was rated with a low level of burnout, 8 out of 10 respondents were classified with moderate burnout and of these 84.8% are women, mostly married (57.6%), aged 33 or less (34.8%), with 12 years or less of service (36.4%) and are civil servants (53.0%). Of the 22.4% classified with a high level of burnout, the results point to similar results with regards to gender, marital status and employment status, differing for age where there is a higher percentage in those over 43 (42.1%) and with longer service (47.4%). However, between the groups and the different variables under study statistical significances were not found.

CONCLUSIONS

We found that in terms of the moderating effects of socio-demographic variables in regard to burnout, age and length of service are variables which allow us to say that over an entire career, professionals should be alert, assessing, forming, preventing and intervening in terms of professional stress factors, vulnerability to stress (coping strategies, personality, social and family support) in order to promote emotional balance and thereby prevent burnout syndrome.

References

- Borges, S. L., & Daniel, F. (2009). Satisfação profissional dos docentes: Uma abordagem sobre instrumentos de medida. *Interacções*, 16, 101-130. Acedido em <http://www.interacoes-ismt.com/index.php/revista/article/view/6/7>
- Costa, F. A., Santos, S. C. A., Passos, A., & Caetano, A. (2008). Um olhar sobre a satisfação com o trabalho: Estudo de caso. In VI Congresso Português de Sociologia (pp. 1-8). Acedido em <http://www.aps.pt/vicongresso/pdfs/398.pdf>
- Dias, A. L. T. (2009). Satisfação no trabalho em Portugal: Uma análise longitudinal com recurso a latent growth curve models (Dissertação de mestrado, Instituto Universitário de Lisboa). Acedido em <https://repositorio.iscte-iul.pt/handle/10071/1981>
- Gonçalves, J. D. A. (2008). Percepção de saúde e qualidade de vida dos enfermeiros (Dissertação de mestrado, Universidade do Algarve). Acedido em <https://sapientia.ualg.pt/bitstream/10400.1/694/2/Disserta%C3%A7%C3%A3o%20de%20Mestrado%20Percep%C3%A7%C3%A3o%20de%20Sa%C3%BAde%20e%20QV%20dos%20Enfermeiros.pdf>
- Mendes, R. M. N. (2008). Historia dos conceitos de saúde e doença. *Nursing*, 18(231), 8-18.
- Mateen, F., & Dorji, C. (2009). Health-care worker Burnout and the mental health imperative. *The Lancet*, 374(9690), 595-597. doi:10.1016/S0140-6736(09)61483-5
- Seabra, A. P. P. C. (2008). Síndrome de Burnout e a depressão no contexto da saúde ocupacional (Dissertação de doutoramento, Instituto de Ciências
- Vital, E., Baltazar, C., Gavinho, C., & Mendes, I. (2006). O processo de profissionalização dos fisioterapeutas portugueses. *Arquivos de Fisioterapia*, 1(2), 2-13. Acedido em http://www.agfisicos.com/~pg22996/media/blogs/AgF/AF/AF1_2_I-57.
- Biomédicas de Abel Salazar da Universidade do Porto). Acedido em <http://repositorio-aberto.up.pt/bitstream/10216/19388/2/Tesefinal.pdf>

Choose A Disability Group That You Would Not Want To Work With: The Views Of Undergraduates

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ABSTRACT

Being a qualified teacher demands gaining the necessary knowledge and skills for instruction and collaboration as well as positive attitudes toward the learners themselves. Personnel preparation programs in special education are the first step to becoming a qualified teacher, where pre-service teachers are equipped with those knowledge, skills and attitudes needed to work with students with disabilities. Special education is one area where attitudes toward students with disabilities are shown to be an important variable in teaching success. These attitudes are in part formed during the undergraduate years and shaped throughout the in-service years. Thus, knowing teacher candidates' attitudes toward students with disabilities may have important implications for shaping personnel preparation programs in the future. Therefore the aim of this study was to investigate the attitudes of pre-service teachers toward students with disabilities.

METHOD

The participants were a total of 118 second grade undergraduate students enrolled in one of the two departments of special education in two different universities in Ankara, the capital of Turkey. Fifty of the participants (42.4%) were pre-service teachers of students with visual impairments (TVI) – School A [male: 13 (11%), female: 37 (31.3%)] while the remaining 68 (57.6%) were of students with intellectual disabilities (TID) – School B [male: 34 (28.8%), female: 34 (28.8%)].

Students were asked one open ended question at the end of their final exam on the “Changing Attitudes toward People with Disabilities” course. A negative question was preferred by the authors with the assumption that asking the participants directly would be a practical way to investigate the potential negative attitudes of the participants which would probably not have been observed otherwise. The question was “*If you were given a choice, which disability group would you prefer not to work with during your beginning years in in-service and why?*”

Descriptive analyses included: (1) frequencies regarding the disability groups chosen and (2) the reasons put forward by the participants for choosing that specific disability, which were conducted independently by the two authors. The Interrater reliability coefficient for category formation was 84%. Discrepancies among the categories regarding the reasons put forward by the participants were solved through a 1 hour meeting by the two authors.

RESULTS AND DISCUSSION

A total of 129 responses were recorded for disability group preferences among the participants. Some of these responses included “the disability group the participant would prefer to work with”, “an emerging positive attitude towards a disability group where s/he would not have preferred to work with before” and “no discrimination among disability groups”. Table 1 shows the frequencies of participant preferences across disability groups.

Table 1. Participant Preferences across Disability Groups

	School 1 (TVI)		School 2 (TID)		Total
	Female	Male	Female	Male	
Type of disability not preferred to work with					
<i>Intellectual disability</i>	14	2	12	10	38
<i>Multiple disability</i>	6	3	4	1	14
<i>Hearing impairment</i>	1	2	2	6	11
<i>Autism</i>	-	-	7	2	9
<i>Visual impairment</i>	-	-	4	4	8

<i>Physical disability</i>	-	-	4	-	4
<i>Severe disability</i>	-	1	-	3	4
<i>Learning disability</i>	-	1	-	1	2
<i>Emotional disorder</i>	-	-	-	1	1
<i>Mild disability</i>	-	-	1	-	1
<i>Students with self injurious behaviors</i>	-	-	1	-	1
<i>Aged students</i>	1	-	-	-	1
Other responses					
<i>No discrimination among disability groups</i>	8	1	1	6	16
<i>Preference in working only with a specific disability group</i>	6	4	-	-	10
<i>An emerging positive attitude toward preference for working with a specific disability group</i>	4	1	2	2	9
Total	40	15	38	36	129

As seen in Table 1, intellectual disability and multiple disabilities were the most undesirable disability groups by the participants and were followed by hearing impairment, autism and visual impairment disability groups.

Four general categories with a total of 213 responses were formed for the reasons put forward by the participants. These categories are depicted in Table 2.

Table 2. *The Rationale for Choosing Among Types of Disabilities*

General category	Subcategory	School 1 (TVI)		School 2 (TID)		Total
		Female	Male	Female	Male	
Rationale for not preferring to work with a specific disability group	Lack of professional competency (modifying instruction, behavior management, classroom management, collaborating with families, lack of experience)	14	9	31	21	75
	Participant's personal characteristics (lack of patience, lack of physical strength, anger, negative prior experience, lack of desire to take responsibility)	15	3	16	16	50
	Incorrect information on the developmental and learning characteristics of students with disabilities (aggression, strength, not teachable, lack of self care skills)	8	1	13	18	40
	Negative working conditions and lack of support services	-	-	9	6	15
Rationale for preferring to work with a specific disability group	Competent only in VI*	4	1	-	-	5
	Characteristics of students with VI match those of the participant's	1	2	-	-	3
	Can only tolerate VI	-	1	-	-	1
	Students with VI can learn	1	-	-	-	1
	Willing to give MD** time and energy	1	-	-	-	1
An emerging positive attitude toward preference	The positive effect of the undergraduate program (gaining the knowledge and skills, direct	3	-	-	2	5

for working with a specific disability group	observation)					
	Personal characteristics (patience and motivation to overcome difficulties)	2	-	-	-	2
Rationale for not discriminating among types of disability	No liberty to discriminate among students with various disabilities	2	-	-	1	3
	Focusing on individual differences rather than the diagnosis	1		1	1	3
	Focusing on modifying teaching rather than the diagnosis	1	1			2
	No problem with type of disability as long as the participant is equipped with the knowledge and skills	1	-	1	-	2
	The undergraduate program is very effective	2	-	-	-	2
	Wouldn't discriminate on the basis of ease of working with a specific disability				1	1
	Motivation to learn and teach with alternative techniques to students of various disabilities	-	-	-	1	1

* Visual impairment

** Multiple disabilities

DISCUSSION

The results displayed above may be discussed as follows:

- It is interesting to note that the disability group that TID did not prefer to work with was intellectual disability, the specific group those pre-service teachers are trained to work with. This finding fits with the attitudes toward disabilities literature in the sense that intellectual disability is the least favored disability in society. In our case, building knowledge and skills of people (i.e. pre-service TID) do not seem to affect attitudes as much as is desired.
- Multiple disability is one group pre-service teachers seem to fear and the reason may be that the more the number of disabilities a student has, the harder instruction becomes. However, the important thing the pre-service teacher should know is that the type, severity and the number of disabilities should not be a matter once a teacher is well equipped with the knowledge and skills needed to work with students with disabilities. We believe that helping pre-service teachers gain this viewpoint is the job of personnel preparation programs.
- The new legislation in special education claims that TVI, TID and teachers of the hearing impaired will be employed in any of the special schools across the nation and this means that a TID may have to work with students with hearing and/or visual impairments. Participants seem to have little or faulty information regarding the developmental characteristics of students with disabilities. Therefore, although personnel preparation programs are involved with one specific disability, they have to focus on building information including all types of disabilities at the undergraduate level.
- Participants who claimed to have experienced a change in negative attitude towards a specific disability believed that this positive change was the result of the undergraduate courses. This shows that an increase in knowledge and skills in the profession is valuable but that programs should work harder to increase the number of pre-service teachers who will build similar attitudes.
- Responses of the participants who did not discriminate among disability groups showed that sensitivity and respect to individual differences as well as competency in assessment and instruction seemed to be effective in such preference. Thus, working on building positive attitudes toward persons with disabilities and assessment and instruction skills may be thought to have important benefits for special education teachers and accordingly, special education in general.

CONCLUSION

Attitudes begin to emerge in the childhood years and change throughout the life cycle by way of various experiences with various others. A person comes across a personnel preparation program during the late teenage and early adulthood years and this program serves to shape attitudes as well. Surely, it is nearly impossible for the undergraduate program to shape an undergraduate's attitudes all by itself. However, it can in certain ways

help its students in building a positive look toward the profession by developing their knowledge, skills and attitudes.

References

- Barr, J.J., & Bracchitta, K. (2014). Attitudes toward individuals with disabilities: The effects of contact with different disability types. *Curr Psychol* DOI 10.1007/s12144-014-9253-2.
- Görsel, F. (2006). Physical education and sports for the disabled course and students' attitudes. *Hacettepe University Faculty of Education*, 31, 67-73.
- Krahe, B., & Altwasser, C. (2006). Changing negative attitudes towards persons with physical disabilities: An experimental intervention. *Journal of Community & Applied Social Psychology*, 16, 59–69.
- Stachura, K., & Garven, F. (2007). A national survey of occupational therapy students' and physiotherapy students' attitudes to disabled people. *Clinical Rehabilitation*, 21, 442-449.
- Tavil, Y.Z., & Özyürek, M. (2009). Gerçekçi bilgilendirme ve etkileşimde bulunmanın özel eğitim öğretmen adaylarının engelli kişilere yönelik tutumlarının değişmesine etkisi. *EKEV Akademi Dergisi*, 13(39), 265-276.
- Woodcock, S., Hemmings, B., & Russell, K.C. (2012). Does study of an inclusive education subject influence pre-service teachers' concerns and self efficacy about inclusion? *Australian Journal of Teacher Education*, 37(6), 1-11.

Comparison Of Online Game Addiction In High School Students With Habitual Computer Use And Online Gaming

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ABSTRACT

The aim of this study is to compare the online game addiction in high school students with the habitual computer use and online gaming. The sample selected through the criterion sampling method, consists of 61.8 % (n=81) female, 38.2 % (n=50) male, 131 high school students. The “Online Game Addiction Scale” developed by Kaya and Başol (2013) and the biographic-demographic information form developed by the researcher were utilized as data collection instruments. The percentage documentation average, independent sample T-test, one-way ANOVA and Kruskal-Wallis were used for data analysis in this study. The result of this study showed that there was a statistically significant difference between the online game addiction and the habitual computer use. It was found out that there was a statistical significant difference between the amount of experience in the use of computer and online game addiction. The difference between the online game addiction and the amount of time spent per day on online gaming was found to be significantly different in terms of statistics according to data in the Troubles, Success and Economic Profit subscale of the online game addiction.

Keywords: Online game addiction, habitual computer use, online gaming.

INTRODUCTION

Today’s technological advances have led to the dramatic increases in the use of the computer and internet technologies. There is no unanimous agreement on the specification of the symptoms of the computer/internet addiction. However, researchers refer to the symptoms of the excessive computer/internet use as playing computer games excessively and using internet too much in comparison with the other addiction types (Kelleci, 2008).

The American Psychiatric Association (1994) described the internet addiction as the increase of tolerance for the internet use, withdrawal and the desire to use it excessively (cited in Orzack, 1998). The psychological tolerance can be defined as the gradual increase in the time in the use of computer for playing computer games, arranging documents continuously or spending a lot of time with interactive discussion groups. In spite of the fact that computer users are cognizant of these problematic behaviours, they insist on using computer excessively. When they cannot have an access to a computer, they manifest the withdrawal symptoms such as ‘anger’ and ‘anxiety’ (Orzack, 1998).

The use of the computer/internet has brought about several activities that can be carried out online. Under the light of these activities, Young (1999) has categorized those under five headings such as cybersexual addiction, cyber relationship addiction, net compulsion, overloaded information and computer addiction. ‘Playing computer games’ has been subcategorized under the computer addiction category (cited in Chou, Condor & Belland, 2005; cited in Kaya, 2013). Defining the internet addiction types as an uncontrollable or compulsive use of the internet, Peltoniemi (2002) categorizes it as follows:

- Online sex addiction
- Chat addiction
- Net relationships addiction
- Net game addiction
- Net gambling addiction
- Surfing addiction
- General addiction on computer and information communication technology.

Leung (2014) referred to the internet addicted adolescents as “net-generation”. Thus, he studied the net-generation adolescents and non-internet addicted adolescents. Whereas non-internet addicted adolescents use the internet to obtain information, ‘net generation’ adolescents spend time on chatting in chat rooms for pleasure or spend their time on interactive online games to escape from the real world.

Freeman (2008) has collected the following terms in various sources and put them in his study. Addiction is defined as the compulsive, continued use of a substance or behaviour known by the user to be harmful. It is considered to be a kind of brain disease that is manifests as compulsive behaviour. Computer addiction has been

referred to as a compulsive use of computers. The term, dependence is the state of being dependent on or unduly subjected to the influence of something or someone. Internet addiction is defined as a compulsive use of the internet or problematic use of the internet. An online game is a game played while connected to the internet, whereas a video game is an electronic game or computerized game played by moving images on a screen or monitor.

Rooij *et. al.* (2010) investigated how many hours per week adolescents spend their time on playing online games. They found that these adolescents spend an average of 55 hours per week on gaming. Data shows that depressive mood, loneliness, social anxiety and negative self-esteem become higher in addicted online gamers in comparison with the other online gamers.

Blinka and Mikuska (2014) studied the role of social motivation and sociability of gamers in the online game addiction. It was found out that social motivation was a predictor of addictive gaming and high social motivation was typical of intensive gamers regardless of their level of addiction. However, in the gamers with a high risk of addiction, their social self-efficacy and interpersonal trust were found to be lower. In addition, generally less socially skilled gamers face further problems in online interactions.

Among the studies related to the computer/internet addiction, this research study purports to provide academicians, researchers, educational program developers and educators with insights into the online game addiction in high school students with regard to their habitual computer use and online gaming.

The Aim of the Study

The present study aims to investigate the online game addiction in high school students from the perspective of habitual computer use and playing online games.

The Problem Statements of the Study

The main problem statement of the study:

“Is there a statistical difference between the online game addiction in high school students and their habitual computer/internet use?”

The following sub questions were prepared to provide an answer to the main problem.

1. Is there a statistical difference between the online game addiction and the years of computer use?
2. Is there a statistical difference between the online game addiction and the amount of experience in the computer use?
3. Is there a statistical difference between the online game addiction and the amount of time spent per day on online gaming?

RESEARCH METHODOLOGY

Research Design

The descriptive type of associational research method was used to carry out this study. The descriptive perspective was utilized for the investigation of related cases. This type of research aims to evaluate the level and the variation between two and more variables (Karasar, 2009).

The Population and Sample of the Study

The population of this research is 131 high school students in North Cyprus. The sample of the research consists of 131 high school students; 61.8 % (n=81) female and 38.2 % (n=50) male participants. The purposive sampling techniques of criterion sampling method have been used for the selection of the participants who had personal computers.

Instruments

“Online Game Addiction Scale” and biographic-demographic information forms were used to collect data. Biographic and demographic information form was prepared by the researcher. It consisted of 12 questions. In this form the participants were asked to answer questions related to (gender, which class he/she attends etc.) as well as computer-internet related questions. “Online Game Addiction Scale” was developed by Kaya and Başol (2013). The Cronbach’s alpha reliability coefficient score of the scale is .91. In Online Game Addiction Scale there are three subscales. These subscales are troubles, success and economic profit. Troubles subscale reflects the level of the trouble experienced because of the habit of playing online games. High scores meant having high

level of troubles and low score meant avoiding troubles. Success subscale indicated the level of one's "continuously playing in order to satisfy oneself and the player's gaining a sense of achievement that depends on playing online games. High success score implies high level of sense of success, while low scores mean no sense of success. Economic profit subscale refers that to the level of achieving economic gains and the effects of these gains by playing online games. The high score shows high level of economic profit and low scores show that player does not have any economic profit from online games. "Online Game Addiction Scale" has a reliability score. Reliability scores of subscales are .70 for the trouble subscale, .70 for the success subscale and .76 for the economic profit subscale respectively.

Data Analysis

All analysis was performed by using the SPSS for Windows. Considering purposes of the study percentage documentation average, one-way ANOVA and Kruskal-Wallis tests were used in data analysis. The statistical significance level was accepted as .05 in the study.

RESULTS

The participants of this study were 131 students who had their personal computers. The group contained 61.8 % (n=81) female and 38.2 % (n=50) male students. The scale was administered to the high school students. The following results were found in line with the problem statement and sub questions of the study.

The first sub-question of the research was expressed as "Is there a statistical difference between the online game addiction and the years of computer use?" The investigation was carried out to compare the years of computer use to the Online Game Addiction Subscale scores by means of the ANOVA Test. Before carrying out the analysis, the homogeneity of the variances was checked by means of the Levene test and the variances were found to be homogeneous as follows:

Troubles: (F=.41; p>.05), Success: (F=.14; p>.05), Economic Profit: (F=1.67; p>.05) and OGA total score: (F=.36; p>.05).

Table 1. The Comparison of the Differences in the Years of Computer Use with the Online Game Addiction Scale Scores (ANOVA)

Subscales	Computer Usage	N	\bar{x}	Sd	df	F	p
Troubles	1-3 years	6	1.61	.97	3	1.38	.250
	3-5 years	27	1.78	.88			
	5-8 years	61	1.74	.86	127		
	8 years up	37	2.09	.93			
	Total	131	1.84	.89	130		
Success	1-3 years	6	1.91	1.17	3	2.00	.116
	3-5 years	27	2.62	1.15			
	5-8 years	61	2.63	1.22	127		
	8 years up	37	3.05	1.20			
	Total	131	2.71	1.21	130		
Economic profit	1-3 years	6	1.58	.91	3	3.83	.011*
	3-5 years	27	1.70	1.06			
	5-8 years	61	1.56	.93	127		
	8 years up	37	2.27	1.14			
	Total	131	1.79	1.05	130		
OGA Total Scores	1-3 years	6	1.72	1.01	3	2.75	.045*
	3-5 years	27	2.09	.92			
	5-8 years	61	2.04	.82	127		
	8 years up	37	2.49	.85			
	Total	131	2.16	.87	130		

* p<.05 statistically meaningful difference

As can be seen in Table 1, there is a statistical significant difference between economic profit subscale scores and the years of computer use such as 1-3 years ($\bar{X}=1.58 \pm .91$), 3-5 years ($\bar{X}=1.70 \pm 1.06$), 5-8 years ($\bar{X}=1.56 \pm .93$), 8 years and up ($\bar{X}=2.27 \pm 1.14$), ($p=.011$).

It can also be seen in the same table that there is a statistical significant difference between total scores of OGA and the years of computer use such as 1-3 years ($\bar{X}=1.72 \pm 1.01$), 3-5 years ($\bar{X}=2.09 \pm .92$), 5-8 years ($\bar{X}=2.04 \pm .82$), 8 years and up ($\bar{X}=2.49 \pm .85$), ($p=.045$).

There is not statistical significant difference between troubles subscale scores and the years of computer use such as 1-3 years ($\bar{X}=1.61 \pm .97$), 3-5 years ($\bar{X}=1.78 \pm .88$), 5-8 years ($\bar{X}=1.74 \pm .86$), 8 years and up ($\bar{X}=2.09 \pm .93$), ($p=.250$). Also, there is not statistical significant difference between success subscale and the years of computer use such as 1-3 years ($\bar{X}=1.91 \pm 1.17$), 3-5 years ($\bar{X}=2.62 \pm 1.15$), 5-8 years ($\bar{X}=2.63 \pm 1.22$), 8 years and up ($\bar{X}=3.05 \pm 1.20$), ($p=.116$).

The second sub-questions of the research was expressed “Is there a statistical difference between the online game addiction and the amount of experience in the computer use?”

The investigation was to compare the amount of experience in the use of computer with the Online Game Addiction Subscale scores by using ANOVA and Kruskal Wallis. Before carrying out the analysis, the homogeneity of the variances was checked by means of the Levene test and the variances were found to be homogeneous as follows:

Success ($F=.23$; $p>.05$), Economic Profit ($F=1.57$; $p>.05$) and OGA total scores ($F=.36$; $p>.05$).

However, the results of the test indicate that the Troubles Subscale variances ($F=4.33$; $p<.05$) are not homogeneous and this subscale has been calculated by using the Kruskal Wallis Test.

Table 2. The Comparison of the Success, the Economic Profit Subscale Scores and OGA General Test Scores with the Amount of the Computer Use Experience (ANOVA)

Subscales	Experience of Computer Usage	N	\bar{X}	Sd	Df	F	p
Success	Little Experience	40	2.45	1.12	2	4.82	.010*
	Moderate Experience	67	2.63	1.18	128		
	High Experience	24	3.37	1.27	130		
	Experience Total	131	2.71	1.21			
Economic profit	Little Experience	40	1.61	.93	2	8.17	.000**
	Moderate Experience	67	1.63	.97	128		
	High Experience	24	2.54	1.18	130		
	Experience Total	131	1.79	1.05			
OGA General Scores	Little Experience	40	1.97	.80	2	8.25	.000**
	Moderate Experience	67	2.05	.80	128		
	High Experience	24	2.78	.94	130		
	Experience Total	131	2.16	.87			

* $p<.05$ statistically meaningful difference

** $p<.001$ statistically meaningful difference

As can be seen in Table 2, there is a statistical significant difference between success subscale scores and amount of experience in the use of computer, such as little experience ($\bar{X}=2.45 \pm 1.12$), moderate experience ($\bar{X}=2.63 \pm 1.18$), high experience ($\bar{X}=3.37 \pm 1.27$), and experience total ($\bar{X}=2.71 \pm 1.21$), ($p=.010$).

1.18), high experience ($\bar{X}=3.37 \pm 1.27$), ($p=.010$). There is a statistical significant difference between economic profit subscale scores and amount of experience in the use of computer, such as little experience ($\bar{X}=1.61 \pm .93$), moderate experience ($\bar{X}=1.63 \pm .97$), high experience ($\bar{X}=2.54 \pm 1.18$) and ($p=.000$). It can also be seen in the same table that there is a statistical significant difference between OGA scale total scores and amount of experience in the use of computer such as little experience ($\bar{X}=1.97 \pm .80$), moderate experience ($\bar{X}=2.05 \pm .80$), high experience ($\bar{X}=2.78 \pm .94$), ($p=.000$).

Table 3. The Comparison of Troubles Subscale Scores with the Amount of the Computer Use Experience (Kruskal-Wallis)

Subscales	Computer Usage	N	\bar{X}	Sd	Mean Rank	X ²	p
Troubles	Little Experience	40	1.70	.82	60.21	8.04	.018*
	Moderate Experience	67	1.73	.80	62.48		
	High Experience	24	2.37	1.09	85.48		
	Total	131	1.77	.87	69.38		

* $p<.05$ statistically meaningful difference

As can be seen in Table 3, there is a statistical significant difference found between troubles subscale scores and amount of experience in the use of computer such as little experience ($\bar{X}=1.70 \pm .82$), moderate experience ($\bar{X}=1.73 \pm .80$), high experience ($\bar{X}=2.37 \pm 1.09$), ($p=.018$).

The last sub-questions of the research were expressed “Is there a statistical difference between the online game addiction and the amount of time spent per day on online gaming?”

The investigation was to compare the amount of time spent per day on online gaming to the Online Game Addiction Subscale scores using by ANOVA and Kruskal Wallis. Before carrying out the analysis, the homogeneity of the variances was checked by means of the Levene test and the variances were found to be homogeneous as follows:

Success ($F=.61$; $p>.05$) and OGA total scores ($F=1.63$; $p>.05$).

However, the results of the test indicate that the Troubles Subscale variances ($F=4.33$; $p<.05$) and Economic Profit Subscale variances ($F=9.34$; $p<.05$) are not homogeneous and this subscale has been calculated by using the Kruskal Wallis Test.

Table 4. The Comparison of the Success Subscale Scores and OGA General Test Scores with the Amount of Time Spent Per Day on Online Gaming (ANOVA)

Subscales	Experience of Computer Usage	N	\bar{X}	Sd	df	F	p
Success	1-3 hours	41	3.23	.94	4	16.11	.000**
	3-5 hours	16	3.75	1.02			
	5-8 hours	6	2.57	.75			
	8 hours up	6	3.79	1.35	126		
	No online gaming	62	2.01	1.02	130		
	Total	131	2.71	1.21			
OGA General Scores	1-3 hours	41	2.47	.72	4	20.38	.000**
	3-5 hours	16	2.91	.67			
	5-8 hours	6	2.45	.42			
	8 hours up	6	3.34	1.16	126		
	No online gaming	62	1.62	.64	130		
	Total	131	2.16	.87			

** $p<.001$ statistically meaningful difference

As can be seen in Table 4, there is a statistical significant difference found between success subscale scores and the amount of time spent per day on online gaming such as not playing online games every day ($\bar{X}=2.01 \pm 1.02$), 1-3 hours ($\bar{X}=3.23 \pm .94$), 3-5 hours ($\bar{X}=3.75 \pm 1.02$), 5-8 hours ($\bar{X}=2.57 \pm .75$), 8 hours up ($\bar{X}=3.79 \pm 1.35$), ($p=.000$). It can also be seen in the same table that there is a statistical significant difference between the OGA scale total scores and the amount of time spent per day on online gaming such as not playing online games every day ($\bar{X}=1.62 \pm .64$), 1-3 hours ($\bar{X}=2.47 \pm .72$), 3-5 hours ($\bar{X}=2.91 \pm .67$), 5-8 hours ($\bar{X}=2.45 \pm .42$), 8 hours up ($\bar{X}=3.34 \pm 1.16$), ($p=.000$).

Table 5. The Comparison of the Troubles Subscale and the Success Subscale Scores with the Amount of Time Spent Per Day on Online Gaming (Kruskal-Wallis)

Subscales	Computer Usage	N	\bar{X}	Sd	Mean Rank	X ²	p
Troubles	1-3 hours	41	2.02	.84	76.28	35.58	.000**
	3-5 hours	16	2.21	1.05	82.50		
	5-8 hours	6	2.51	.48	100.75		
	8 hours up	6	3.29	1.09	110.92		
	No online gaming	62	1.42	.60	47.23		
Economic Profit	1-3 hours	41	1.98	1.07	75.89	30.57	.000**
	3-5 hours	16	2.79	1.40	94.69		
	5-8 hours	6	2.04	.90	83.33		
	8 hours up	6	2.54	1.55	85.17		
	No online gaming	62	1.31	.54	48.52		

** $p<.001$ statistically meaningful difference

As can be seen in Table 5, there is a statistical significant difference between the troubles subscale scores and the amount of time spent per day on online gaming such as not playing online games every day ($\bar{X}=1.42 \pm .60$), 1-3 hours ($\bar{X}=2.02 \pm .84$), 3-5 hours ($\bar{X}=2.21 \pm 1.05$), 5-8 hours ($\bar{X}=2.51 \pm .48$), 8 hours up ($\bar{X}=3.29 \pm 1.09$), ($p=.000$). Also, there is a statistical significant difference between success subscale scores and the amount of time spent per day on online gaming in the not playing online games such as not playing online games every day ($\bar{X}=1.31 \pm .54$), 1-3 hours ($\bar{X}=1.98 \pm 1.07$), 3-5 hours ($\bar{X}=2.79 \pm 1.40$), 5-8 hours ($\bar{X}=2.04 \pm .90$), 8 hours up ($\bar{X}=2.54 \pm 1.55$), ($p=.000$).

DISCUSSION AND CONCLUSION

This study has sought to find out whether the high school students' online game addiction varies with regard to their computer use and online gaming habits. The results of the study indicate that there is a statistically significant difference between economic profit and the years of computer use scores in terms of the online game addiction subscale. It has been found out that the students who used the computer more than eight years obtained economic profits from online games. In addition, the computer use of eight years or more risks the online game addiction. According to Kim *et. al.* (2005) the average money spent for online games was \$30.90 per month. Both studies show that the financial issues have an impact on the online game addiction.

With respect to the online game addiction was studied and it has been discovered that the students with a higher experience in online gaming differ from those with a lower experience from the perspective of the computer use experience. The study revealed that the students in question were successful in online gaming, they earned money from online gaming and the online gaming troubled their lives. Wilfong (2006) states that "The computer self-efficacy and the computer-experience composite were each used as separate models to predict computer-anxiety, of which computer self-efficacy had the most significant impact. However, when combining these two variables to predict computer-anxiety, computer self-efficacy also had the most significant impact." Thus, the feeling of success in online gaming against one's rival accounts for having the feeling of success and self-efficacy.

This study tried to show whether there was a significant difference between the hours per day spent on online gaming and the online game addiction. It was found out that the students who spent eight hours or above on online gaming had trouble in their lives, developed the feeling of success and earned money. In the study carried out by Kim *et. al.* (2005), the mean amount of time spent on the game per day was 313.09 minutes. Rooij *et. al.*

(2010) found that adolescents reported an average of 55 hours per week on gaming and they also showed that the addicted online gamers had a higher depressive mood, the feeling of loneliness, social anxiety and negative self-esteem than the other online gamers. Block (2008) studied the South Korean students who spent the average of 23 hours per week on online gaming and found that 1.2 million students were probably at the risk of addiction. Therapists worry about the increasing number of students' low school achievements, dropping out of school to spend time on computers. Internet addiction is resistant to treatment and high relapse risks regrettably. According to the results of these studies, the related studies support one another and they indicate that as the online gaming time increases, the students are affected negatively.

Only the high-school adolescents with the families of the higher socio-economic status and with higher educational level participated in this study. The students with the families of lower socio-economic status and lower educational level could be investigated in another study. Having a large sample of students with different backgrounds may enable researchers to generalize the results for the whole community. If further studies can be carried out with the other age groups cause, it may provide further insights into online game addiction.

In conclusion, the results of the study show that the understanding of the “at risk” population of the online game addiction and provide us with basic information that can contribute to the development of the education program and the prevention program for high school students who are addicted or risk groups for online gaming addiction.

References

- Blinka, L. & Mikuska, J. (2014). The role of social motivation and sociability of gamers in online game addiction. *Journal of Psychosocial Research on Cyberspace*, 8(2), Article 6.
- Block, J. J. (2008). Issues for DSM-V: Internet addiction. *Am J Psychiatry*, 165(3), 306-307.
- Chou, C., Condon, L. & Belland, J., C. (2005). A review of the research on Internet addiction. *Educational Psychology Review*, 17(4), 363-388.
- Freeman, C., B. (2008). Internet gaming addiction. *The Journal for Nurse Practitioners*, 4(1), 42-47.
- Leung, L. (2004). Net-generation attributes and seductive properties of the internet as predictors of online activities and internet addiction. *Cyberpsychology & Behavior*, 7(3), 333-348.
- Orzack, H. M. (1998). Computer addiction: What is it? *Psychiatric Times*, 5(8), 2-3.
- Peltoniemi, T. (2002). *Net addiction in Finland*. First Prevent Conference of Telematics in Addiction Prevention, Athens, Greece.
- Karasar, N. (2009). *Bilimsel araştırma yöntemi*. Ankara: Nobel Yayın Dağıtım.
- Kaya, A., B. (2013). *Çevrimiçi oyun bağımlılığı ölçeğinin geliştirilmesi: Geçerlilik ve güvenilirlik çalışması*. Unpublished Master's Thesis, University of Gaziosmanpaşa, Tokat, Turkey.
- Kelleci, M. (2008). İnternet, cep telefonu, bilgisayar oyunlarının çocuk ve gençlerin ruh sağlığına etkileri. *TAF Preventive Medicine Bulletin*, 7(3), 253-256.
- Kim, J., E., Namkoong, K., Ku, T. & Kim, S., J. (2008). The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *European Psychiatry*, 23(3), 212-218.
- Rooji, A., J., Schoenmakers, T., M., Vermulst, A., A., Eijnden, J., J., M. & Mheen, D. (2010). Online video game addiction: Identification of addicted adolescents gamers. *Addiction*, 106(1), 205-212.

Computer Training Programs In Secondary Schools

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ABSTRACT

In the twentieth century in which a new social order was created under the name of information society, all countries were poised to compete in an environment of digital race especially in educational fields coherent with the demands of contemporary times.

In this study a draft of various programs needed for the use of computers in education and training was constituted. After this draft, such programs as Computerized Test Programs (CTP), Programs for Computerized Video Use (CVUP), Intelligent Educational Programs (IEP), Special Educational Utilities (SEU), Programs for Educational Games (EGP) and Simulation Programs (SP) together the objectives of these programs, their accurate use and their relationship with computers were briefly introduced.

Keywords: computerized education, computer training programs, education, student.

INTRODUCTION

So far, there are several studies on positive and negative impacts of Computerized Education (CE) on education process and the research on this issue is still continuing. Some studies contain important issues. In their study, Kulik J. A., Kulik C. C. and Cohen P. A. (1980) founded that students, who took courses based on CE, had significant 0.25 standard deviation according to their ability levels. In another study, Kulik J. A., Bangert R. L. and Williams G. W. (1983) analyzed 51 empirical studies and identified that attitudes of students from 6th to 12th grades were significant in terms of the results of CE courses. The grades of students on CE oriented courses increased from 50% to 63% and 0.32 standard deviation.

Computers provide productivity to today's education system however using computers is not enough to implement education and teaching activities; or in other words they do not solely make education real and productive. In this context, computerized education programs make learning easy and entertaining but some activities are expected from students. One of these is students' hard work and active participation in studies. In a computerized environment, where these two situation do not interact or where there is no motivation, even best experts and highly developed Computer Educational Programs (CEP) are not very useful or effective (ROSS, S. M., & Morrison G. R., 1988).

MATERIAL AND METHOD

Today use of computers in education has introduced new terms and concepts. Development of computer technology introduced more than 100 thousand words and phrases to the English language. This development also caused the necessity for developing countries to transfer or produce these new words into their own languages during to the process of new technology based education. Use of computers for educational purposes has begun as science education in enterprises since these devices were invented. Use of computers for administrative purposes has gained two significant functions called central administration and administration management. Use of computers by administrators or their contribution to administrators are concerned with writing reports, registrations, recording of accounting and student lecture notes, attendance status and control of all these (İsmail İPEK, 2001).

In addition to this general framework, teachers' main duty, although he or she does the teaching, is to perform as an administrator within the classroom. Teachers are responsible for some duties such as preparation of reports and class notes, copying of exam documents, preparation of student notes and their status in the end of the semester, filling data files of students and planning for the acquisition of necessary tools for teaching. These are activities that are not directly related to teaching but contributing to the teaching process. For example, different computer programs are used in order to calculate and keep student transcripts.

On the other hand, determination of students' individual needs, analysis and leading education process to provide these needs are very important educational processes. It is the teacher's duty to identify sources and present possible ways of solution and needs in solving student problems. There is a computer program developed to help teachers as administrators. This is called computer management instruction (CMI). This program helps all activities of teachers performed during the education process. It unites and combines all management activities of education process and it contains evaluation of student homework as well. The program is used for correspondence and quantitative data that are needed by students.

Another interesting point is that experts, students and their custodians confuse two terms: computer education and computer-based instruction. This situation is a significant mistake and a big problem in the Turkish Education System. Individuals, who are not expertise on computer use or who have limited experience with that, should understand organizational structure of computers, learn basic components and concepts of them as well as their applicability with regard to education. This is possible through computer education. Computer education is not education or instruction with computers, because the use of computers and new technologies may not necessarily require that each individual has a good knowledge of computer language. Some educators considered that teaching any language program is a waste of time.

RESEARCH FINDINGS

As a result of today's technological innovations, individuals and students should know rudiments, concepts, programming language, maintenance of technology and hardware and structure of computers. In addition to presentation of this information to users on a upper level, education programs that include *Computer Literary*, concerning different subjects (Jonassen, 2000). The purpose of these programs is to realize education through technology. The goals of these programs should be equipped with activities which would include future computer courses and realize knowledge and applications.

For us, computer-based instruction achieves educational and instructional goals with the help of computers. Computers here as a form of the new technology, contribute to the education process. This process helps students to adapt appropriate behaviors through proper Computer-Based Program (CBP) Visual learning process of an individual appears in cognitive process. Therefore, Computer-Based Instruction Programs (CBIP) have been designed. This situation is presented on figure 1 (Bashirov Novruz, 2006).

The figure illustrates the following programs:

1. Training and Trial Programs (TTP): The aim of Computer-Based Instruction Programs (CBIP) to lead students to practice and remind them about their knowledge. The trial technique does not depend of performance of computers and it is not used for instruction. In other words, this program does not involve teaching; instead it improves skills concerning a foreign language, vocabulary and grammar through practice. Therefore, it is essential to develop such programs for different subjects and different scientific fields. The main purpose of these programs is not teaching but making decisions and do practice with the help of given questions. Generally, such programs are used in mathematics, physics, chemistry and foreign languages.

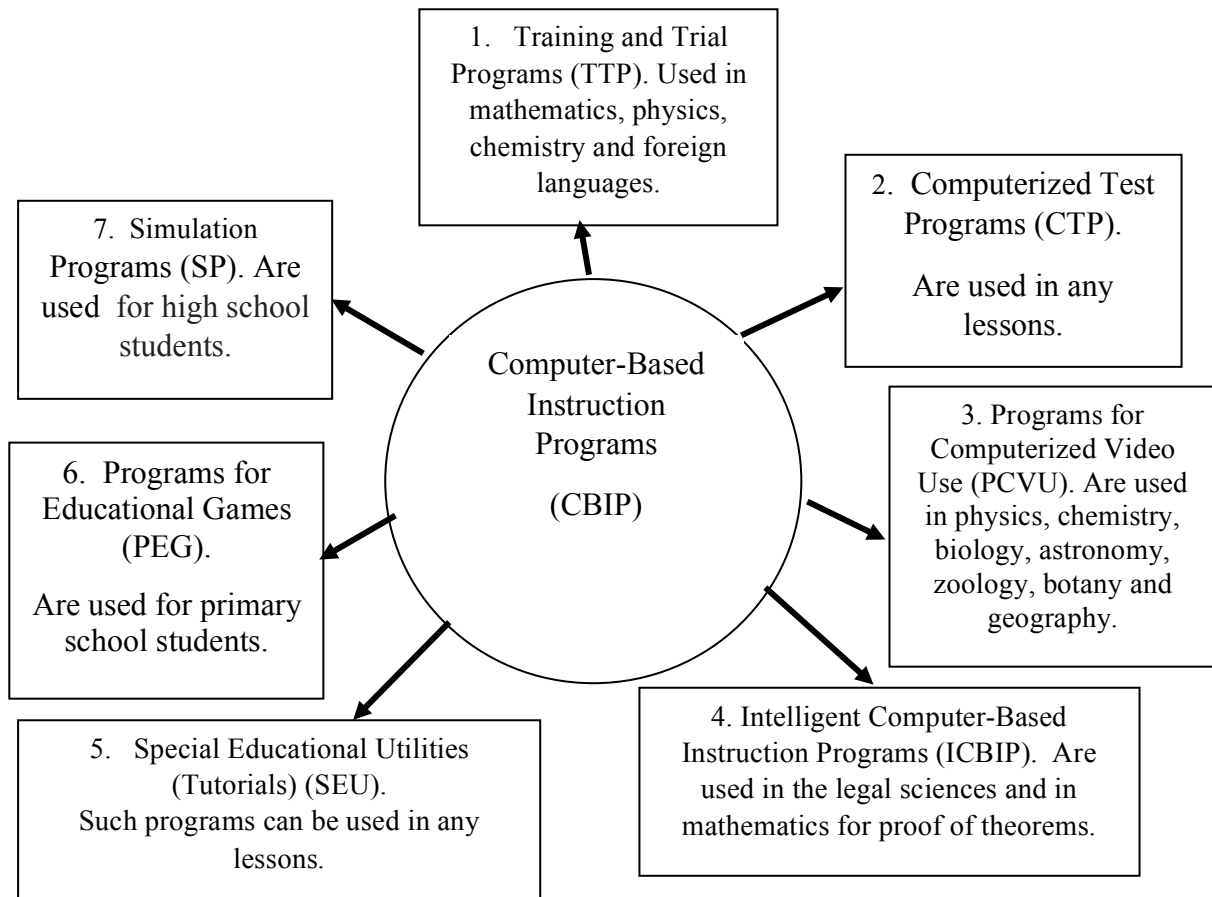


Figure 1. Computer-Based Instruction Programs

2. Computerized Test Programs (CTP): Although the word “learning” covers a very long period in education process, in our language it is frequently misused instead of the term “education”. For this reason we prefer the word “education” and talk about “education process”. Learning, education and program evaluation help to define elements in education process in a better way. In the end of this process, we can reach information about student’s needs, education strategies and quality or effectiveness of the program. Through modern technology and creative programs, it is possible to achieve interaction and combine traditional education tools of measurement and evaluation. These data should be used in order to apply them into real situations of learning. Here, we confront computerized tests. Therefore, it is essential that education model should be based upon these rudiments. Such programs are used in any lesson.

3. Programs for Computerized Video Use (PCVU): New technologies are the main components of the mentioned multimedia systems. One of these components in video that is used in computer-based instruction. The video system is traditionally known as videotape or videodisk. These two systems, despite their educational and technical difference, carry the same information. During the computer-controlled use of these technologies, or the duration between “start” and “finish”, “videodisk” rapidly transfers information and images to the screen; in other words it operates fast. Such programs are mainly used in physics, chemistry, biology, astronomy, zoology, botany and geography lessons.

4. Intelligent Computer-Based Instruction Programs (ICBIP): Here, we define innovative parts of Computer-Based Instruction Programs (CBIP), which are open to new ways of creativity and technological development, logical and talented, as Artificial Intelligence (AI). The research on Artificial Intelligence is a recent scientific field investigated by scholars whose potential scientific studies and findings are included. In a way, all tested findings were analyzed in this phase, become realized and presented to the market. Therefore Artificial Intelligence (AI) studies and Intelligent Computer-Based Instruction studies should coincide. Respectable scholars and CI experts such as Dede (1989, 1998), Jonassen (1988, 2000), Jonassen et. al. (1999), Kearsley (1989), Venezky and Osin (1991) wrote noteworthy articles on this issue. In addition, İpek (2001) did research on this subject. According to these studies, ICBIP approach contains the following major components:

- a) Student model or approach
- b) Scientific level of students
- c) Pedagogic level and approach
- d) The design, effective use and development of the system.

Developing such type of model requires a long term and great effort. Nevertheless, this system (*expert systems*) could be applied in smaller organizations and different levels of school in the future. The main purpose of these programs is to create intelligent environment for students. Such programs are used in legal sciences and in mathematics to prove theorems. The creation of these programs is very difficult.

5. Special Educational Utilities (Tutorials): The aim of this program is to provide an interactive environment through one-to-one education between a student and a computer. Therefore, when a topic is put forward, questions concerning this topic are asked to a student. Then decisions are made in accordance with the student's comprehension. During the process, the program (*tutor*) can provide new information, feedback on students' shortcomings (*review*) and additional information (*remediation*) to incompetent students. It is a suggested individual instruction technique for computer-based instruction. Such programs can be used in any lesson.

6. Educational Game Programs (EGP): Educational Game Programs provide students with motivation. In a way, it is a waste of time to use a computer-based instruction program without any educational value. It is very important how educational games influence education and instruction. In order to achieve this, student's control and qualifications of the program should be at high levels. The use of a quality program and its contribution to learning will make instruction effective. The important thing is that these game programs motivate students. These programs are designed as significant and realistic games. Therefore, during the learning process, students obtain valuable talents or information. It is impossible not to agree with this view. Most importantly, the properties of game programs with educational value should be developed. The main purpose of these programs is to give the knowledge to students through a variety of games. Such programs are used for primary school students.

7. Simulation Programs (SP): It is difficult to define and explain the impacts of simulation programs in the processes of education and instruction. In these processes, students imitate a learning situation and environment or establish similarities with reality, then, he or she finds opportunities to learn and realize it. In computer-based instruction, simulation programs might trigger a very creative and interesting way of learning. A sub-level of these programs is to present and demonstrate a virtual situation. However, the aims and process of learning are not realized in this phase. These programs only visually present some situations. Teacher can use a simulation program and present it to his or her students in a class activity. Such programs are used for high school students.

CONCLUSION

In conclusion, this study discussed the use of computers in education and instruction. Furthermore, the study evaluated computer-based instruction and its techniques, it presents basic functions of these techniques in terms of creative, critical and significant learning. At the same time, the study briefly discussed problem solving environments, intelligence computer-based instruction and interactive media technologies. The study briefly introduced methods and techniques of computer-based instruction and gave clues about the accurate use of these techniques and CBIP design. Here, considering our fields of expertise, experience and works, we prefer this definition because new terminologies used in Azerbaijan and Turkey generally begin with the contributions of experts who are engaged in technical education process. This approach is a suggestion and it also underlines a necessity for a vocabulary, which is convenient to our language and which might be widely accepted.

References

- ALESSI, S. M., & Trollip, S. R. (1991). Computer-based instruction: Methods and development. (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall, Inc.
- BASHIROV, Novruz: ALIYEV Alekper : BASHIROVA Aynura. (2008). Computer training and self-training. Scientific papers of the South Kazakhstan State University named after M. Auezov, № 16, pp. 61 - 66.
- BASHIROV, Novruz: ALIYEV, Alekper: BASHIROVA, Aynura. (2008). Algorithms for creation of Automated teaching courses. Scientific papers of the South Kazakhstan State University named after M.Auezov, № 16, pp. 66 - 70.
- BASHIROV Novruz (2006). The psycho-ergonomic principles of the creation of computer-assisted training courses. "The news of Azerbaijan State Pedagogical University named after N. Tusi", Natural Sciences series, № 2, pp. 375-380, (in Russian).

- BASHIROV Novruz, BASHIROVA Aynura (2004). The Structure of Computer-aided Training Systems. “The news of Azerbaijan State Pedagogical University named after N. Tusi”, Natural Sciences series, № 1, pp. 175-177, (in Russian).
- BASHIROV Novruz, BASHIROVA Aynura (2004). Computerization of self-study training. “The news of Azerbaijan State Pedagogical University named after N. Tusi”, Natural Sciences series, № 4, pp. 60-63, (in Russian).
- BASHIROV Novruz (2002). Expert Systems. Baku, “Nurlan”, 164 p.
- BASHIROV Novruz (2006). Creation of dialogue system for computer training. “The news of Azerbaijan State Pedagogical University named N. Tusi”, Natural Sciences series, № 4, pp. 418 – 424, (in Russian).
- DEDE, C. (1998). Probable evolution of artificial intelligence based educational devices. *Technological Forecasting and Social Change*, 34, 113-115.
- DEDE, C. (1989). Planning guidelines for emerging instructional technologies, *Educational Technology*, 29(4), 7-12.
- Ismail IPEK (2001). Computer training: Design, Development and Methods. Ankara, 360 p. (in Turkish).
- JONASSEN, D. H. (Ed.). (1988). Instructional design for microcomputer courseware. Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc.
- JONASSEN, D. H. (2000). Computers as mind tools for school: Engaging critical thinking. (2nd Ed.). Upper Saddle River, New Jersey: Prentice-Hal, Inc.
- JONASSEN, D. H., Peck, K. L., & Wilson, B. G. (1999). Learning with technology: A constructivist perspective. Upper Saddle River, New Jersey: Prentice-Hall, Inc.
- KEARSLEY, G. (1989). Artificial Intelligence and Instruction: Applications and Methods. Reading, MA: Addison-Wesley.
- Kulik, J. A., Bangert, R. L. & Williams, G. W. (1983). Effects of computer-based teaching on secondary school students, *Journal of Educational Psychology*, 75(1), 19-26.
- Kulik, J. A., Kulik C. C., & Cohen, P. A. (1980). Effectiveness of computer-based college teaching: a meta-analysis of findings, *Review of Educational Research*, 50(4), 525-544.
- ROSS, S. M., & Morrison G. R. (1988). Adapting instruction to learner performance and background variables. In D. H. Jonassen (Ed.). Instructional design for microcomputer courseware. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- VENEZKY, R., & Osin, L. (1991). The Intelligent design of computer-assisted instruction. White Plains, NY: Longman Publishing Group.

Concept Images Of Pre-Service Mathematics Teachers In Educational And Science Faculties Regarding The Basic Concepts Of Geometry

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ABSTRACT

The main purpose of this research is to determine the concept images of pre-service mathematics teachers in educational and science faculties regarding the basic concepts of geometry (line, line segment, plane, space, vectors and vector operations). The study group of the research was consisted of 90 pre-service teachers majoring in mathematics in a public university educational and science faculties. The Geometrical Concept Test about particular mathematical concepts including four open-ended questions was applied to pre-service teachers. The data of this study were evaluated by using qualitative and quantitative research methods. Quantitative data was obtained through frequency and percentages and qualitative data was collected by coding the responses provided by the pre-service teachers to the open-ended questions. An agreement over the data was reached by comparing the data which was coded independently by the researchers with each other. After deciding on the common evaluation criteria, concept images of the pre-service teachers regarding the basic geometrical concepts were analyzed. According to the findings obtained in this study, pre-service teachers both in educational and science faculties had inadequate concept images regarding the basic geometrical concepts according to their grade levels including freshman students with the lowest rates. Pre-service teachers reported that they did not recognize the importance of the concepts as they did not investigate the definitions of the concepts and the importance of this case was not emphasized. Suggestions were made for the future researchers in the light of the research findings.

Keywords: mathematics teachers

INTRODUCTION

When teaching and learning mathematics is considered, the structure of mathematics is one of the most important factors, which is needed to be paid attention. Mathematics as a discipline because of its axiomatic structure is different from other sciences and based on definitions and axioms. Although the concepts are used without knowing their definitions in everyday life, they are given with their definitions in mathematics. In this sense, they are different from the concepts in everyday life. Our first experiences regarding with the mathematical concepts are related with their definitions. The other concepts are learnt through these first experiences. For this reason, the basic necessity for learning mathematics conceptually is to construct concepts accurately.

Mathematic educators Tall and Vinner (1981) defined cognitive structure including all the mental images that individuals created in their minds, related with the mathematical concepts which are accepted as accurate by the mathematics authorities, as “concept image”. Since individuals create concept images regarding with the mathematical concepts through their own experiences and they have different experience processes about the concepts, the concept images of the individuals may not be in accord with the abstract mathematical definition of the concept. This situation is very important for the prospective teachers who will make the organization of an effective teaching. Because, preparing learning environments where prospective teachers can reach conceptual learning dimension is only possible when they have accurate and extensive concept images in themselves (Ma, 1999; McDiarmid, Ball, and Anderson, 1989). According to Brown and Borko (1992) one of the most important obstacles in front of the training of the prospective teachers is their limited knowledge of mathematics. It can be claimed that these opinions are also valid for teaching geometry (Brown and Borko, 1992; cited in: Bozkurt ve Koç, 2012).

Geometry is among the most important discipline areas of mathematics which improves multi-dimensional thinking abilities. According to Baykul (2004) geometry is a science related with point, line, plane, planar shape, space and spatial shape and correlations among them, For Hızarcı (2004) it is a science which helps individuals to have different perspectives, and enables them to reach a solution by visualizing figures. Teaching basic geometrical concepts is becoming more important when we consider geometry as a bridge for individuals to understand the environment where he/she lives and other mathematical subjects. At this point it is necessary to now conceptual information levels of prospective teachers who will construct basic geometrical concepts into students’ minds.

It is seen that there are difficulties in defining geometrical concepts (Duartepe Paksu, Musan, İymen and Pakmak, 2012; Gutierrez and Jaime, 1999; Linchevski and others., 1992; Koç and Bozkurt, 2011; Tunç and Durmuş, 2012); they cannot think that there can be more than one definition referring to a single concept (Linchevski and others., 1992); they have memorized the definitions of the concepts (de Villiers, 1998) If individuals who are learning mathematics will study in a major about mathematics, they should learn definitions and how these definitions will be used (Vinner, 1991). In accordance with the facts stated above, carrying out studies which will present the concept images of the prospective teachers related with geometrical concepts will especially play an important role in evaluating how prospective teachers construct content knowledge in educational and science faculties that are training teachers. For this reason, it is necessary to increase the number of studies which set forth the importance of conceptual knowledge and measures the conceptual knowledge of prospective teachers. The purpose of this study is to analyze concept images of prospective teachers who are studying in the third year of teaching mathematics department of educational faculties and 1st and 4th year in science faculties related with the geometrical concepts such as line, plane, space and vectors. In this context it was searched how line, plane, space and vector concepts were defined by the participants.

METHOD

Research Design

This study was carried out according to both qualitative and quantitative research methods. While percentage and frequency were used as quantitative analysis, document analysis and observations were conducted during qualitative research procedure. The data obtained was evaluated by using ‘content analysis’ technique. The purpose of content analysis is to reveal the truths that can be hidden in the data and to describe the data. (Yıldırım and Şimşek, 2008). The basic operation in content analysis is to combine similar data around specific concepts and themes and interpret them by organizing the data in a way that readers can understand.

Working Group

The study group was consisted of 90 prospective teachers from a public university in Ankara. 30 of those students (21 female and 9 male) are third year students in teaching primary school mathematics department and freshman (20 female and 10 male) and senior students (23 female and 10 male) in mathematics department of a science faculty respectively. 71 % of the prospective teachers are female and 29 % of them are male.

Data Collection Tools and Collecting Data

The data were collected by using ‘Basic Geometric Concepts Test (BGCT)’ which was prepared by the researchers. This form prepared by the researchers was distributed to prospective teachers and they were asked to fill in this form. Prospective teachers were given 45 minutes (one course) to fill in this form. BGCT was consisted of 10 open-ended questions which were developed by researchers by taking expert opinions to determine the concept images of prospective teachers in basic geometric concepts. Only four questions of BGCT were evaluated for this study.

Data Analysis

The study started by conducting a test with ten questions to prospective teachers who are studying in teaching primary schools department of an educational faculty and mathematics department of a science faculty in a public university in Ankara. After the application of the test, the data were analyzed separately. Some questions were combined under one question again by considering the similarity of the students’ answers. After the results of the evaluation, the agreement between the researchers and the experts was calculated by using the formula specified by Miles and Huberman (1994) as in the following “*The Ratio of Agreement = [Agreement / (Agreement + Disagreement)] x 100*”. It was determined that the agreement ratio between expert and researchers differed between 0.89 and 0.95. Thus, four basic questions which involved line, plane, space and vector concepts and that could serve the purpose of the study were considered and an evaluation was conducted over these four questions. In order to analyze the obtained data, first of all three criteria were determined by the researchers. These were; i) correct ii) acceptable iii) wrong and empty. In this sense, the analyses were carried out according to the criteria set by the researchers. The researcher and two experts from teaching mathematics major evaluated each problem separately and the results were then compared. The differences appeared were discussed and then an agreement was obtained. In conclusion, the results of the evaluation conducted in a way to be related with each dimension were presented on the basis of frequency (f) and percentage (%).

The Reliability and Validity of Study

The validity in qualitative research means observing the searched issues objectively as much as possible and as it is (Kirk & Miller, 1986). In order to present a holistic picture of the searched topic, the researcher should confirm the data and outcomes of the study through variation, participant confirmation and colleague

confirmation (Yıldırım & Şimşek, 2008). In this regard, data of this study was analyzed by two experts in the field of teaching mathematics other than the researchers and the validity of the study was provided through colleague confirmation.

The qualitative research begins with the thought that realities constantly change according to individuals and to environments and repeating the same study with similar groups may not create the same results. In this regard, in order to provide reliability to qualitative research, the researcher should define the individuals who are the source of information clearly (Yıldırım & Şimşek, 2008). In this study, to get reliability, the study group defined in details.

In addition to that, the data obtained were frequently given in the study. Besides, the results of the evaluation were presented on the basis of frequency (f) and percentage (%). The purpose here is to increase the reliability of the data, to reduce bias and to provide a chance to make a comparison between the data. Besides, the data presented in numbers in order to have an opportunity to repeat this small scale study later on to reach a wider sample with tools such as surveys (Yıldırım & Şimşek, 2008).

FINDINGS AND COMMENTS

In this part, the findings regarding with ‘the concept images about the line, plane, space and vector concepts of prospective teachers who are respectively third year students in teaching primary school mathematics department, freshmen and senior students in mathematics department of a science faculty’ were presented.

Table 1: ‘BGCT’ Test Results of Third - Year Prospective Teachers who are studying in Teaching Primary School Mathematics Department

	Correct	Acceptable	Wrong	Empty
1 st Question (Line)	2/30; %6.6	12/30; %40	8/30; %26.6	8/30; %26.6
2 nd Question (Plane)	5/30; %16.6	20/30; %66.6	5/30; %16.6	0/30; %0
3 rd Question (Space)	12/30; %40	10/30; %33.3	4/30; %13.3	4/30; %13.3
4 th Question (Vector)	1/30; %3.3	25/30; %83.3	3/30; %10	1/30; %3.3

According to Table 1, a few like 6% of the prospective teachers were able to describe correct equation defined in R^3 vector structure according to the change of the t parameter; while 40% of them gave acceptable and 26.6 % of them gave wrong answers to this question, 26.6 % of them did not answer this question. Also, while 16.6 % of the primary mathematics prospective teachers defined plane concept correctly, 66.6 % of them gave acceptable answers and 16.6 % of them gave wrong answers. Similarly, while 40 % of the primary mathematics prospective teachers were able to define space concept correctly, 33.3 % of them gave acceptable and 16.6 % of them gave wrong answers. 16.6 % of them did not answer this question by leaving empty to this question. On the other than while 3.3 % of the primary mathematics prospective teachers were able to define vector concept correctly, 83.3 % of them gave acceptable and 10 % of them gave wrong answers. 3.3 % of them did not answer this question by leaving empty to this question. According to these results, it can be said that prospective teachers have difficulties in expressing the conceptual meaning of the vector concept and also they were not able to construct the change of R^3 vector equation according to the situation of t parameter of given line. In general sense, it is thought that the percentage of giving correct answers for the ‘space’ concept is higher than the other concepts; this may be because of the fact that prospective teachers use space concept more in function subject of the courses such as General Mathematics and Analysis I, II and III.

Table 2: ‘BGCT’ Test Results of First Year Prospective Teachers who are studying in Mathematics Department of a Science Faculty

	Correct	Acceptable	Wrong	Empty
1 st Question (Line)	3/30; %10	4/30, %13.3	9/30; %30	14/30;%46.6
2 nd Question (Plane)	2/30; %6.6	8/30,%26.6	18/30; %60	2/30; %6.6
3 rd Question (Space)	11/30;%36.6	5/30;%16.6	8/30; %26.6	8/30, %26.6
4 th Question (Vector)	1/30, %3.3	21/30; %70	2/30; %6.6	6/30; %20

According to Table 2, 10% of the mathematics prospective teachers were able to describe correct equation defined in R^3 vector structure according to the change of the t parameter; while 13.3 % of them gave acceptable and 30 % of them gave wrong answers to this question, 46.6 % of them did not answer this question. Also, while 6.6 % of the science faculty first year prospective teachers defined plane concept correctly, 26.6 % of them gave acceptable answers; 60 % of them gave wrong answers and 6.6 % of them did not answer this question. Similarly, while 36.6 % of the science faculty first year prospective teachers were able to define space concept correctly, 16.6 % of them gave acceptable and 26.6 % of them gave wrong answers. 26.6 % of them did not answer this question by leaving empty to this question. Besides, while 36.6 % of the science faculty first year prospective teachers were able to define vector concept correctly, 70 % of them gave acceptable and 6.6 % of them gave wrong answers. 20 % of them did not answer this question. According to these results, the concepts that science faculty first year prospective teachers gave most of the correct answers were first of ‘space’ and line concepts; the least number of correct numbers were given for the concepts of ‘plane’ and ‘vector’. When acceptable answers are considered, although prospective teachers did not fully construct the concept of vector, it can be said that they still have information about this concept. When wrong answers are evaluated, it can be stated that prospective teachers have difficulties in describing the concept of plane. When all the wrong and empty answers for all the concepts are considered in general, it can be expressed that science faculty first year prospective teachers have weak concept images regarding the concepts within the scope of this study.

Table 3: ‘BGCT’ Test Results of Fourth Year Prospective Teachers who are studying in Mathematics Department of a Science Faculty

	Correct	Acceptable	Wrong	Empty
1 st Question (Line)	6/30; %20	8/30, %26.6	11/30;%36.6	5/30; %16.6
2 nd Question (Plane)	0/30; %0	5/30,%16.6	21/30; %70	4/30; %13.3
3 rd Question (Space)	11/30;%36.6	6/30;%20	5/30; %16.6	8/30,%26.6
4 th Question (Vector)	4/30, %13.3	22/30;%73.3	0/30; %0	4/30; %13.3

According to Table 3, 20% of the science faculty fourth-year mathematics prospective teachers were able to describe correct equation defined in R^3 vector structure according to the change of the t parameter; while 26.6 % of them gave acceptable and 36.6 % of them gave wrong answers to this question, 16.6 % of them did not answer this question. Also, while none of the science faculty fourth year prospective teachers defined plane concept correctly, 16.6 % of them gave acceptable answers; 70 % of them gave wrong answers and 13.3 % of them did not answer this question. Similarly, while 36.6 % of the science faculty fourth year prospective teachers were able to define space concept correctly, 20 % of them gave acceptable and 16.6 % of them gave wrong answers. 26.6 % of them did not answer this question by leaving empty to this question. Besides, while 13.3 % of the science faculty fourth year prospective teachers were able to define vector concept correctly, 73.3 % of them gave acceptable and 13.3 % of them did not answer this question. None of the science faculty fourth year prospective teachers gave wrong answer to this question. According to these results, the concepts that science faculty fourth year prospective teachers gave most of the correct answers were first of ‘space’ and ‘line’ concepts; the least number of correct numbers were given for the concepts of ‘plane’ and ‘vector’. When acceptable answers are considered, although prospective teachers did not fully construct the concept of vector, it can be said that they still have information about this concept. The most outstanding result here is that none of

the senior students did not provide correct answers to plane concept. When wrong answers are evaluated, it can be stated that senior prospective teachers like the other prospective teachers have difficulties in describing the concept of plane. When all the wrong and empty answers for all the concepts are considered in general, it can be stated that science faculty fourth year prospective teachers have weak concept images regarding the concepts within the scope of this study.

CONCLUSION, DISCUSSION AND IMPLICATIONS

It can be said according to the results of this study which was conducted to search the concept images regarding the basic geometrical concepts of prospective teachers who are in their third year in an educational faculty and in their first and fourth year in a science faculty that prospective teachers generally define the concepts and have difficulties in understanding the symbolic structure of the mathematics. Considering both wrong and empty answers altogether, primary mathematics department first year prospective teachers could not sense line concept according to t parameter; a few of them were able to give correct answers to plane concept. Considering the space concept one fourth of the prospective teachers were not able to give an answer and approximately one fifth of them were not able to give an answer to vector concept. If we discuss these results together with the acceptable answers of the prospective teachers to questions, in fact it can be said that they have weak concept images. Because, most of the prospective teachers were not able to give correct answers to line question; that is they had difficulties in understanding line equation given in a symbolic form. This result is thought as an indicator that mathematical language that was constructed by the participants did not turn into a defining ability for the other concepts. Besides, while almost half of the third year educational faculty prospective teachers were able to define space concept, most of them were able to define vector concept in acceptable level. The fact that participants did not acquire geometrical concepts conceptually may have prevented them to make correct definitions (Linchevsky and others., 1992). Therefore, it can be accepted as an indicator that the third year prospective teachers did not internalize Analytic Geometry and Geometry courses given in the educational faculty so they were not able to acquire conceptual learning dimension. This finding of the study is parallel with the results of the following studies (Duatepe Paksu and others. 2012; Koç and Bozkurt, 2011; Tunç and Durmuş, 2012).

On the other hand, discussing the wrong answers together with the empty answers of the science faculty mathematics department first year prospective teachers, one fourth of the prospective teachers were not able to understand line concept given in vector form according to t parameter; more than half of the prospective teachers were not able to give correct answers to plane concept. Discussing the space concept, while half of the prospective teachers were not able to give an answer to the question, for the vector concept one of fourth of the teachers were not able to answer to the question. Similarly, if we discuss these results together with the acceptable answers of the prospective teachers to questions, it can be said that science faculty first year mathematics prospective teachers' concept images are highly different than their concept definitions. This situation is an important result that should be underlined for the prospective teachers who came to mathematics department by answering the majority of the mathematics and geometry questions in university entrance examination.

Evaluating science faculty fourth grade mathematics prospective teachers both who did not answer to the 'line' question and who gave wrong answers together, it can be said that more than half of the prospective teachers were not able to specify a line equation given in a vector form according to t parameter. This situation emerges as a quite thought provoking issue when it is evaluated in terms of the fact that the education received in universities improves prospective teachers' ability to use mathematical language. On the other hand, since the participants are science faculty fourth year students, this result is important both in terms of pedagogic content knowledge about how future teachers will transfer the concepts that they were not able to construct in their own minds to students and questioning why the university education could not construct permanent knowledge level. Besides the fact that none of the teachers were able to answer the plane question and only one fifth of the prospective teachers were able to give acceptable answers make us to think that in fact it is a result of the attempt to teach geometrical concepts generally by using examples instead of definitions. In de Villiers' study (1998) the dominant idea is stated as the road followed for improving the understanding of students in geometry concepts through giving concepts by using examples without engaging students with the complex structures present in the nature of the process of defining geometric concepts will create more understandable structures. The results of this study are also parallel with the idea stated above. Also, as Villers stated, constructing mathematical definitions in mathematics education was not considered as important as the mathematical activities such as problem solving, making hypothesis, generalizing and proof. This finding of the study is also supporting de Villers. On the other hand, although the participants gave more correct answers to space concept than the others, it was only 36.6% of the prospective teachers. However, only 13.3% of the participants gave correct answers to vector concept. We can say from this result that prospective teachers use concepts completely in operational level without questioning them and they are not able to define even the very basic concepts. This result of this

study fits with the finding of Çetin and Dane (2004) together with Duatepe Paksu, Musan, İymen and Pakmak (2012) that prospective teachers had lack of knowledge about the geometric concepts, they were not able to recognize concepts and they were not able to use them. In the light of the findings of this study, the necessity to emphasize conceptual learning is once again occurred. Even though only the concept images about the basic geometrical concepts of prospective teachers who are studying in educational and science faculties were analyzed in this study, similar studied should be carried for the other course contents. Besides, the importance of concepts and constructing accurate concept images should be evoked to prospective teachers. According to Schneider and Stern (2005) conceptual knowledge is the knowledge which involves basic concepts and principles in the subject and the relations among them for this reason, definitions of the concepts play an important role in constructing conceptual knowledge. From this perspective the researcher who asks the question why thinks that it will be useful to discuss the necessity of how learning environments and the presentation style of the course contents can be enriched in universities for training prospective teachers.

References

- Baykul, Y. (2004). *İlköğretimde matematik öğretimi*. Ankara: Pegema Yayıncılık.
- Bozkurt, A. ve Koç, Y. (2012). İlköğretim matematik öğretmenliği birinci sınıf öğrencilerinin prizma kavramına dair bilgilerinin incelenmesi. *Educational Sciences: Theory & Practice*, 12(4) , 2941-2952.
- Çetin, Ö. F. ve Dane, A. (2004). Sınıf öğretmenliği III. sınıf öğrencilerinin geometrik bilgilere erişimi düzeyleri üzerine, *Kastamonu Eğitim Dergisi*, 12(2), 427–436.
- De Villiers, M. (1998). *To teach definitions in geometry or teach to define*. In A. Olivier & K. Newstead (Eds.), *Proceedings of the twenty-second international conference for the psychology of mathematics education: Vol.*
- Duatepe Paksu, A., Musan, M., İymen, E. ve Pakmak, G. (2012). Sınıf öğretmeni adaylarının boyut konusundaki kavram görüntüleri. *Buca Eğitim Fakültesi Dergisi* 34.53-68.
- Gutierrez, A., & Jaime, A. (1999). Pre-service primary teachers' understanding of the concept of altitude of a triangle. *Journal of Mathematics Teacher of Education*, 2 (3), 253-275.
- Hızarcı, S. (2004). Sunuş. (Edt: S. Hızarcı, A. Kaplan, A. S. İpek & C. Işık). *Euclid geometri ve özel öğretimi*. Ankara: Öğreti Yayınları.
- Linchevsky, L., Vinner, S., & Karsenty, R. (1992). To be or not to be minimal? Student teachers views about definitions in geometry. In W. Geeslin & K. Graham (Eds.), *Proceedings of the sixteenth international conference for the psychology of mathematics education, Vol. 2* (pp. 48–55). Durham USA.
- Kirk, J., & Miller, M. L. (1986). *Reliability and validity in qualitative research*. Beverly Hills, CA: Sage.
- Koç, Y., & Bozkurt, A. (2011). Evaluating pre-service mathematics teachers' comprehension level of geometric concepts. In B. Ubuz, (Ed.), *The Proceedings of the 35th annual meeting of the international group for the psychology of mathematics education Vol. 1*. (p. 335). Ankara, Turkey.
- Ma, L. (1999). *Knowing and teaching elementary mathematics: Teachers' understanding of fundamental mathematics in China and the United States*. Mahwah, NJ: Lawrence Erlbaum.
- McDiarmid, G. W., Ball, D. L., & Anderson, C. (1989). *Why Staying One Chapter Ahead Doesn't Really Work: Subject-Specific Pedagogy*. In M. C. Reynolds (Ed.), *Knowledge Base for the Beginning Teacher* (pp. 193–205). Elmsford, NY: Pergamon Press.
- Miles, M. B., & Huberman, M. A. (1994). *An expanded sourcebook qualitative data analysis*. London: Sage Publication.
- Schneider, M., & Stern, E. (2005). *Conceptual and procedural knowledge of a mathematics problem: Their measurements and their causal interrelations*. Retrieved Nisan 24, 2014 from <http://www.ifvll.ethz.ch/people/schmich/SchneiderStern2005.pdf>
- Tall, D., & Vinner, S. (1981). Concept images and concept definitions in mathematics with particular reference to limits and continuity. *Educational Studies in Mathematics*, 12, 151-169.
- Tunç, M. P., & Durmuş, S. (2012). Pre-service elementary school classroom and mathematics teachers' interpretations about the definition of angle concept. *Energy Education Science and Technology Part B: Social and Educational Studies*, 4 (1), 131-140.
- Vinner, S. (1991). The role of definitions in the teaching and learning mathematics. In D. O. Tall (Ed.), *Advanced mathematical thinking* (pp. 65-81). Dordrecht: Kluwer.
- Yıldırım, A., Şimşek, H. (2008). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. Ankara: Seçkin Yayıncılık.

Congruence In Phrasing Between Music And Rhythmic Gymnastics Routine As Perceived By Musicians And Dancers

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ABSTRACT

Phrasing is an important aspect in both music and choreography, not only for dancing but also in many sports routines such as rhythmic gymnastics, martial arts, synchronized swimming and figure skating. The understanding of phrasing between music and movement provides a clear and meaningful structure to the entire routine. This study aims to look into whether perception of the congruence of phrasing varies if respondents are trained in different disciplines. Fifty-one musicians and fifty-one dancers participated in this experiment and were asked to choose between two videos. One video was taken from an original rhythmic gymnastics routine and the other was modified to enhance the musical phrasing to synchronize with the movement of the gymnast. The result shows that the enhanced video was chosen by the majority of both musicians and dancers regardless of their training. This indicates that the congruence of phrasing between music and movement was identified by both groups of respondents.

INTRODUCTION

Phrasing is one of the important elements in contributing to the structure and direction in music, dance, or movement-related activities such as sports routines. Parallels between music and dance have been explained (Hodgins 1992) in which phrasing in both subjects contributes to the structural content as categorized in one of the intrinsic relationships defined by Hodgins, along with the rhythmic, dynamic, textural, qualitative and mimetic. Structure in dance relates to the corresponding motives or figures and phrasing. It was stated that 'structural correspondences are created when musical structures, motives and phrasing match the morphodynamic architecture of the choreography' (Mason 2012). Without appropriate interpretations between music and dance or movement-related routines, the perceptions of phrasing between these two subjects could contradict or contribute to a different meaning when the two subjects are combined. This study reports a preliminary study on the perception of phrasing in a rhythmic gymnastics routine, using ribbon as the apparatus, by two groups of respondents who were trained in different disciplines - music and dance. The research aimed to investigate if a more congruent phrasing between music and movement could be similarly identified by both groups of respondents. The result was taken from a project analyzing congruence between music and sports routines from a range of different aspects.

PERCEPTION OF PHRASING IN MUSIC AND MOVEMENT

Before looking into dance or any choreographed routine, analysis of phrasing of the movement amongst instrumentalists was conducted long ago to look at how musical phrasing affects the movement in musicians. It was found that increased movement by an instrumentalist is synchronized with increased rates of phrasing, dynamics and rubato (Juchniewicz, 2008:424). It was also revealed that the movement of the performer relates to the rhythmical structure of the phrases in a piece of music (Wanderly et al., 2005). In the same research, it was found that performers' movements were noticeable at the beginning and ends of phrases.

In the context of choreomusical analysis, Hodgins (1992:39) parallels music and movement under the structural category in intrinsic relationship. Intrinsic relationship was defined as 'emanate[ing] from the realms of musical and kinesthetic gesture [...] their interpretation largely unprejudiced by context' (Hodgins, 1992:39). Phrase/period was listed as part of the structural content in Hodgins's choreomusical theory along with 'motive/figure' and 'larger structures'. Synchronizations between dance/movement and music were investigated in many researches and these proved that the congruence between music and movement can be perceived in different conditions (Krumhansl and Schenck, 1997; Mitchel and Gallaher, 2001). Similarly to dance, sports routines such as taichi, figure skating and rhythmic gymnastics equally involve music and choreography. Phrasing between the two was examined qualitatively (Loo and Loo, 2013a), analyzing the perception of musical phrasing employed in a tai chi routine from a musical and dance perspective. The relationship between musical details and the philosophy of tai chi movements was also examined (Loo and Loo, 2012; Loo and Loo, 2013b; Loo and Loo 2013c). In a more quantitative approach, the perception of phrasing was also analyzed in order to examine whether an intended congruence of phrasing could be identified by respondents (Loo et al., 2013d). It

reveals that the video of a routine with enhance synchronization between music and movement was rated significantly to have a better phrasing. However, these perceptions were based very much on a musical perspective since all respondents came from a musical background. A preliminary study on respondents with a background in dance was also investigated through a rhythmic gymnastics routine (Loo and Loo, 2014). Although the majority of the respondents generally rated the video with an intended congruence between music and movement contributed more to the overall performance of the routine, the results were not compared to other respondents with different backgrounds.

METHODS

Video for comparison

A rhythmic gymnastics routine (using ribbon) performed by a trained gymnast was recorded for this study. Using the same video recording, the music was changed with a new composition which was intended to provide a better congruence in terms of phrasing, accents, tempo, rhythm and so forth. The same routine in the video was then edited; one with the original musical track used by the gymnast and the second with the new music composition. This was to make sure that the sonic environments in both videos were of the same quality.

Participants and procedure

Fifty-one musicians and fifty-one dancers participated in this experiment. All respondents were between the ages of eighteen and twenty-two. The musicians were undergraduates in one of the tertiary education colleges who have a musical background of at least eight years; the dancers were either students or performers who had been trained in ballet for at least eight years. As this reports on one of the preliminary surveys, respondents were asked to choose which of the video provides a better match in phrasing between music and movement. To avoid an irrational primacy effect, twenty-six respondents from each of the musician and dancer group watched the original video followed by the second video with new accompaniment; the rest of the respondents from both groups watched the video with new accompaniment followed by the original. After watching both videos, they were required to rate and choose either video 1, video 2 or 'both the same' based on the given questions. A chi-square test was used to analyze whether there are any significant differences in the ratings between musicians and dancers.

FINDINGS AND DISCUSSION

All respondents (n=102) evaluated which videos has the better phrasing quality between music and movement; some chose 'both the same' when they felt there was no difference between the two. Table 1 and Figure 1 show the percentage and frequency of the selection by the two groups of respondents. Most of the musicians (66.7%) chose video 2, which was edited with the new accompaniment, to have a better congruence in phrasing between the music and movements by the gymnast. The same applies to the dancer group, although the percentage was not as high in comparison to musicians. 35.3% of the dancers felt that both the videos present the same quality in terms of phrasing.

Table 1: The frequency distribution between musicians and dancers.

Groups	Video 1	Video 2	'Both the same'	Total
Musicians	6 (11.8%)	33 (64.7%)	12 (23.5%)	51
Dancers	5 (9.8%)	28 (54.9%)	18 (35.3%)	51

From the chi-square analysis ($p < 0.05$), it is revealed that there is no significant difference in the perception of phrasing between musicians and dancers based on the result $X^2 = 1.701$ and $p = 0.427$ (Table 2). The Cramer V table further confirms that there is no significant relationship between specialization and perception of phrasing. This means that the phrasing in this experiment was perceived similarly by two groups regardless of the respondents' backgrounds. Although the video was enhanced based on a musical perspective towards the choreography and movement, dancers, who acquire more experience in using music accompaniment in various movements, similarly noticed the increase of congruence in phrasing between music and movement.

Figure 1: Selections of videos by musicians and dancers

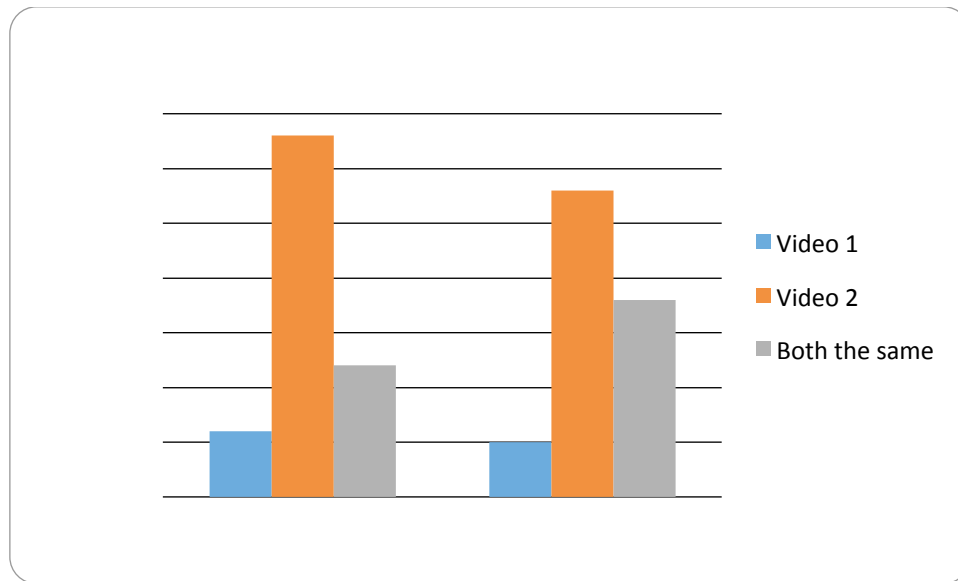


Table 2. Results of Chi-Square Analysis

Groups	Perception on Phrasing			χ^2	sig- χ^2
	Video 1	Video 2	'Both the same'		
Musician	<u>6</u>	<u>33</u>	<u>12</u>	<u>1.701</u>	<u>0.427</u>
Dancers	<u>5</u>	<u>28</u>	<u>18</u>		

Although focusing on a sports routine, this result further supports that the level of congruence between can be identified and perceived by viewers, as in much research in both dance (Krumhansl and Shenck, 1997; Mitchell & Gallaher, 2001) and film (Marshall and Cohen, 1988; Bolivar et al 1994; Camurri & Mouslend, 2010). This experiment also parallels other results in the same project that we are analyzing and investigating in relation to music and movement in different sports routines such as tai chi (Loo and Loo, 2015). As addressed in this paper, another concern to be considered is to look into the different perceptions of audiences with various backgrounds and levels of experience, the reason being that although music is used, many of these subjects such as sports routines and dance have been performed to and evaluated by experts who may have little or no musical background. Despite being competitive events, many of these dances or sports routines are performed to public audiences who may or may not have a dance or musical understanding but may be trained in other disciplines. As in Brownslow et al.'s (1997) study on the perception of dancers' movements and characteristics, it is found that general traits and characteristics were recognized by both professional and novice dancers but details were only noticed by the professional dancers. In terms of phrasing, it was also found that regardless of a structured or unstructured movement, experts in dance were better at recalling a phrase than novices (Starkes et al., 1990 taken from Henley 2014). The merging of two subjects also creates many subjective and extreme opinions since all subjects were looking closely from their own perspectives. Therefore, both qualitative and quantitative studies are useful to support the aim of these studies.

CONCLUSIONS

This paper investigates the perceptions of phrasing between music and movement by respondents who have a background in music and dance. Since phrasing is one of the aspects shared between the two subjects, the research aimed to look into whether perceptions are vary due to the different background and expertise. Using one of the routines as a model for experiment, it was found that there is no significant difference between the

perceptions of phrasing by musicians and dancers. The current research not only aimed to look into the importance of congruence between the two subjects, to investigate the different perceptions of viewers, but also to analyze the ability of music to change different perceptions or the quality of a movement. These experiments are in progress and will be reported in future articles.

References

- Bolivar, V. J., Cohen, A. J., & Fentress, J. C. (1994). Semantic and formal congruency in music and motion pictures. *Psychomusicology: Music, Mind & Brain*, 13(1), 28-59.
- Brownlow, S., Dixon, A. R., Egbert, C. A., & Radcliffe, R. D. (1997). Perception of movement and dancer characteristics from point-light displays of dance.
- Camurri, A., & Moeslund, T. (2010). Visual Gesture Recognition. *Musical Gestures-Sound, Movement, and Meaning*. New York: Routledge.
- Henley, M. K. (2014). Is perception of a dance phrase affected by physical movement training and experience?. *Research in Dance Education*, 15(1), 71-82.
- Hodgins, P. (1992). *Relationships Between Score and Choreography in Twentieth- Century Dance: Music, Movement, and Metaphor*. Lewiston: The Edwin Mellon Press.
- Juchniewicz, J. (2008). The influence of physical movement on the perception of musical performance. *Psychology of Music*, 36(4), 417-427.
- Krumhansl, C. L., and Schenck, D.L. 1997. Can dance reflect the structural and expressive qualities of music? A perceptual experiment on Balanchine's choreography of Mozart's Divertimento No.15. *Musicae Scientiae*, 1(1), 63-85.
- Marshall, S. K., & Cohen, A. J. (1988). Effects of musical soundtracks on attitudes toward animated geometric figures. *Music Perception*, 95-112.
- Mason, P. H. (2012). Music, dance and the total art work: choreomusicology in theory and practice. *Research in Dance Education*, 13(1), 5-24.
- Mitchell, R.W., and Gallaher, M.C. (2001). Embodying Music: Matching music and dance in memory. *Music Perception*, 19(1), 65-85.
- Loo, F.Y. and Loo, F.C. (2012). Chinese Science in Piano Pedagogy: Evaluating the Chronicles of Piano Playing Technique with Taichi. *Procedia – Social and Behavioral Science Journal*, Vol.46 (2012), 3102 – 3106.
- Loo, F.C. and Loo, F.Y. (2013a). The perception of musical phrasing in correlation to movements in sports routines, *World Applied Sciences Journal*, 25 (4): 592-599.
- Loo F.Y. & Loo F.C. (2013b) Mapping Melodic Contours on Taiji Diagram: Taijiquan Physical and Philosophical Perspectives in Action. *International Journal of Asian Social Science*, 3(2):405-415.
- Loo F.Y. & Loo F.C. (2013c). Taichi Qi Flow in the Kinematic Process of Piano Playing: An Application of Chinese Science'. *World Applied Sciences Journal*, 21(1), 98-104.
- Loo, F.C., Loo, F.Y. Chua Y.P. (2013d). Perception of Congruence between Music and Movement in a Rhythmic Gymnastics Routine, *Journal of Basic and Applied Scientific Research*. 3(11)259-268.
- Loo, F.C. and Loo, F.Y. (2014). The perception of dancers on the congruence between music and movement in a rhythmic gymnastics routine, *Life Science Journal*. 11 (6): 339-344.
- Loo, F.C. and Loo, F.Y. (2015). Visual Perception of Phrasing in a Tai Chi Routine Using Different Music Accompaniments. *Procedia-Social and Behavioral Sciences*, 174, 3044-3048.
- Starkes, J. L., Caicco, M., Boutilier, C., & Sevsek, B. (1990). Motor recall of experts for structured and unstructured sequences in creative modern dance. *Journal of Sport & Exercise Psychology*, 12(2), 317-321.
- Wanderley, M. M., Vines, B. W., Middleton, N., McKay, C., & Hatch, W. (2005). The musical significance of clarinetists' ancillary gestures: An exploration of the field. *Journal of New Music Research*, 34(1), 97-113.

Conscription, Crisis, Continuance And Continuity

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ABSTRACT

Concern for, analysis of, and speculation about higher education have intensified during the first fifteen years of the new millennium. Broad access to digitized information, including online courses and social media has demystified the creation and conveyance of knowledge. As expectations for economic and social stability associated with earning baccalaureate degrees falls short of desired outcomes for many graduates, there has been a call for increased transparency and accountability throughout higher education. Public scrutiny, whether from individuals, legislative bodies or academic evaluators confirm inconsistent and incompatible preparation of undergraduates for projected realities and demands of the future. Knowledge and skills required for entry-level professional positions are neither efficiently delivered nor effective preparation for many graduates. The collective history, evolution and purposes of higher education around the world, may be summarized by four common approaches. *Firstly*, education is designed to enhance communication through a common vocabulary of shared meaning that enables individuals, families and societies to work, play and live together with minimal conflicts, disturbances and disruptions. *Secondly*, education provides incentives and support for those who can solve important problems through deliberation, collaboration and research. A *third* function of education has been to nurture creativity; with a *fourth* and final purpose, to encourage thought and contemplation. As higher education expands in the *global* context it appears irrefutable that formal post-secondary study is now so absolutely necessary for survival, that it is to be openly disseminated and cost- free to everyone; in essence, a *de facto* human right. This premise is supported by a proliferation of open source scholarship, online courses and multi-national campuses. The purpose of this paper is to examine four ways of analyzing the state of higher education as *conscription*, *crisis*, *continuance* or *continuity*, since each approach may lead to unique conclusions about, and strategies for the future of higher education. Recent challenges about quality, meaning and integrity of academic programs examine critical issues of access to, equity and excellence of academic programs, since financing education is often an implied or explicit responsibility of political authority and governing bodies. These perspectives, many of which are captured in major motion pictures, will be investigated through the lens of higher education in the United States, a nation known for juggling multiple systems of post-secondary education that anticipates emerging industry needs, personal career goals and supports socio-political cohesion.

Key Words: Access, equity, global learning, higher education, human right, quality, social justice, transparency

INTRODUCTION

The undergraduate degree is often, and increasingly, viewed as a minimum credential leading to full time professional employment. While employers, as well as current employees may describe the diploma as an expensive and time-consuming *Harry Potter*-style port-key to a full-time entry-level position, still others believe an academic degree confirms both ability *to learn* and ability *to do*. Of interest, is the decline in belief that a primary role of education is fulfilling societal goals; perhaps understandable in light of the increasingly global context knowledge acquisition and application.

The United States is known for its historically democratic approach to providing access to education, and in recent decades devising mechanisms to fund higher education so as not to encumber graduates with debt that undermines economic viability. Higher education has come under increased scrutiny in the new millennium, and the U.S. system is frequently at the heart of both criticism and speculation as nations seek successful models for educating their masses. Informing and influencing directions for higher education in coming decades are demographic trends, technological advances, economic challenges at the domestic and international levels and socio-cultural changes (Keller, 2008). The purpose of this paper is to examine issues challenging higher education and to identify common themes that will shape either future of higher education.

The four historic purposes of higher education, introduced above, may be described as 1) preparation for work, 2) providing a foundation for well-rounded and deeply grounded learning, and 3) for advancing research and scholarship; more recent emphasis on attention to the environment, social justice , international understanding and increased awareness of and sensitivity to religion, culture, gender, and sexuality (Keller, 2008). Establishing a coherent, if not common mission, as well as devising a structure for delivering ample education to the population ready to achieve desired outcomes, is a formidable task. This is further complicated by the philosophy driving the required minimum level of education and the motivation of those participating. Four guiding questions are posed, as a result of a preliminary examination of literature. Informed by integrative

theoretical frameworks such as critical pedagogy since power differentials inevitably result from differences in educational background (Freire, 2005), Experiential Learning Theory (Kolb & Kolb, 2008; Kolb, 1984) that captures the integrative and reflective components of holistic learning, as well as common core competencies - writing, math, critical reasoning, information literacy, and the ability to appropriately use technology in the access and production of knowledge.

GUIDING QUESTIONS

1. Is higher education an individual right and voluntary experience, or is an investment in compulsory education necessary to attaining the greater, common good?
2. What is the highest level of formal education that should be supported through public funding?
3. Are there common outcomes, metrics and analytics helpful in determining educational effectiveness for all learners?
4. Can (should/ will) higher education successfully disconnect learning from lifestyle to enhance value of learning and knowledge?

Four descriptive approaches to higher education emerged; conscription, crisis, continuance, and continuity, and are discussed in the following sub-sections of this paper.

Conscription (everyone has to go to college like serving in the Israeli army)

As noted above, higher education is increasingly viewed by both policy makers and the general public as primarily a private benefit, rather than a broader social good. Over 90 percent of U.S. adults believe that every high school student who wants a four-year college education should have the opportunity to gain one, according to a 2003 survey, and two-thirds believe state and federal governments should invest more money in higher education – but nearly two-thirds believe that students and their families should pay the largest share of the cost of a college education. Given ongoing access barriers, these perceptions may make it more difficult than in the past for historically underserved groups to enroll in college, at a time when they are becoming a larger proportion of the college-age pool. Ironically, these changed perceptions come at a time when high school students of all ethnic backgrounds are completing substantially more college preparatory and advanced coursework in science and mathematics than previous generations, as a result of higher state graduation and college admission requirements. Having achieved higher levels of academic preparation, however, students may find themselves shut out of four-year colleges if these institutions reduce enrollments or raise admission standards further, Zusman, p.13”.

Crisis A second approach to higher education has been as if managing a current or anticipated crisis. Numerous examples abound throughout US history; early founding of US colleges and universities in response to European elite academies; responses to war-time challenges for intelligence or weapons, response to declining competitiveness in aerospace, manufacturing, automotive industry and organizational/managerial productivity. For the most part it has been presumed that post-secondary education is essential for many full time positions, thus fueling an increased demand for, and expectation of competing higher education thus creating a crisis level demand for higher education. In addition, beliefs that over subscription would then result in access affordability issues, led to lowered expectations of success for students coming out of high school. Other factors must be examined, since presumed obstacles to higher education are not insurmountable.

Poverty, however, is the biggest barrier to college attendance. Students from poor families of all ethnic backgrounds and those whose parents did not have a college education are even less likely than underrepresented minorities as a whole to enroll in college or even to complete high school, as a result of what some critics argue is “an elaborate, self-perpetuating system of social and economic class that systematically grants advantages to those of privilege.” Among those who do enter college, perhaps a third or less enroll in four-year colleges, and very few enroll in the nation’s elite institutions. Young adults from families in the bottom income bracket are eight times less likely than others in their age group to complete a bachelor’s degree. Financial burden, lower levels of academic preparation, and lower expectations – all of which correlate with poverty and parental education – contribute to these negative outcomes, Zusman, p.11”. Those not succeeding may become part of another growing U.S. alternative to post-secondary education –prison- an extremely costly default, also borne by taxpayers.

Continuance or Continuity? While the distinction between these two terms may seem moot, emphasizing their difference is important to the discussion of current issues in higher education. Three Merriam dictionary definitions of *continuance* are described as (1) continuation, (2) the extent of continuing (duration) and (3) the quality of enduring (permanence). Continuance suggests just doing what has always been done in order to keep doing what you are doing. In the present discussion, then higher education in its more or less present form, would presumably just keep going in order to increase its duration and permanence as a system.

Continuity, however, refers to (1) uninterrupted connection, succession, or union or (2) uninterrupted duration or continuation especially without essential change (Source: <http://www.merriam-webster.com/dictionary/continuity> . In the present discussion the first definition captures the essence of the distinction being made between educational philosophies, wherein the uninterrupted connection, succession and union of systems and practices overshadows the maintenance of processes, policies and structures through which individuals gain entrance into planned systems.

Critics of higher education often focus on the United States system because of its longevity and alleged ability to meet diverse societal needs. Carey (2015) characterizes the history of U.S. higher education as a series of big ideas: firstly, to fuel the agricultural, industrial and commercial growth of the nation's economy; secondly, to create research communities to anticipate future, as well as to address current problems or issues, and thirdly, to offer opportunities to produce well-rounded scholars through liberal arts education. In response, undergraduate institutions often reflect a combination of these approaches, and as a result, may do none well. For example, Arum & Roska (2014) followed up their 2011 study and found that one response to an uncertain global economy, lack of confidence in career preparation, and extended adolescence, as captured in movies like *failure to Launch*. Jake New (2014) selected the following enlightening excerpt in his review of their work:

"Both students and the schools they attend exist in larger structural and cultural contexts that have created the conditions under which the observed learning outcomes occur," the authors write. "Widespread cultural commitment to consumer choice and individual rights, self-fulfillment and sociability, and well-being and a broader therapeutic ethic leave little room for students or schools to embrace programs that promote academic rigor...The result: Colleges are producing graduates with happy memories of their time in college but little sense of purpose or any "clear way forward, p. 2". The following table captures some of the competing values and goals inherent in crafting higher education systems that must meet such diverse, disparate, and often divergent goals, whether for individuals, the marketplace of for higher education.

Table 1. Educational Phases, Motivations and Value

<i>Educational Phase</i>	<i>Description</i>	<i>Primary Motivator</i>	<i>Quality, Integrity & Meaning</i>
Conscription	Mandatory-Survival	Extrinsic- Required	Low- Unknown/Delayed
Crisis	Foot-in-Door (Entry-level Career)	Intrinsic and Extrinsic-Security	Low- Unknown
Continuance	Step-up (Promotional Career)	Extrinsic - Recognition	High- Taught by professionals in field
Continuity	Feather-in-Cap (Lifelong Learning)	Intrinsic- Achievement	High

Table 1 incorporates motivations and meaning into the four phases of higher education as conscription, as a response to crisis, as the continuance of a process in progress, or as continuity of self- evolution. Each approach may be seen as driven by a specific motivators (intrinsic, extrinsic or a combination of the two), and is characterized by certain levels of meaning and integrity.

At the *Conscription* level, learners perceive educational experiences as required and basic. The motivation is primarily extrinsic since participation is driven by law and viewed as essential to ability to sustain independence. As a result, the perceived integrity and meaning of earning a diploma is somewhat unknown or delayed.

The *Crisis* level usually occurs at the nexus of dependence and independence, regardless of age. Here, education is viewed as a critical step to gaining personal security in the workplace or obtaining that essential foot-in-the door leading to initial employment leading ultimately to job security/employability. Motivation is both intrinsic and extrinsic since drivers are both personal accomplishment and earning a paycheck. Ironically, the meaning, relevance and integrity of the degree are as yet unknown or un proven; a condition that is exacerbated by organizational prioritization of on the-job training over degree preparation. Individuals often just persevere through learning experiences to earn a credential that may or may not be connected to specific career goals.

When individuals arrive at the *Continuance* level, emphasis shift toward obtaining recognition and reward, often associated with attaining professional rank, prestige, certification and promotion. Individuals generally associate success with career-related accomplishments, economic stability and positive social recognition. Education has some degree of meaning, often because continuing education is delivered by professionals in one's chosen field and thus presumed to be relevant and respected.

Life-long learning may be another way to describe the *continuity* phase. Here primary motivation shifts to intrinsic with high levels of personal satisfaction and achievement associated with learning. The individual identifies new challenges associated with education that may or may not be connected to professional or social advancement. This is the old-fashioned *learning for learning's sake* phase that was once presumed as an integral and necessary feature at all of the phases of education discussed in this section.

Simply put, it is evident that individuals as well as sub-groups within society may describe their approach to education as one or more of the summative educational phases presented in Table 1, above. Societal outcomes associated with education, however, are rarely linked with continuity, but tend to focus on the functional ability to produce individuals who can take care of themselves, operating as independent “adults” and self-sustaining members of the social order. The relative meaning and integrity of their education tends to be secondary, peripheral, but nonetheless associated with academic status and competition among institutions for prestige.

As a result, the primary purpose and function of education in the current era has little to do with an innate quest for lifelong learning, but rather the ability to produce workers who contribute to the health and holistic wellbeing of themselves, minimally, and others, ideally. It is no wonder that conversations about the purpose and status of education persist, are increasingly contentious, and are complicated in both definition and delivery by predicted controversies surrounding social equity, rights to education and excellence.

Equity and Excellence

There are many issues indicating that the relationships among educational access, social equity and academic excellence are non-linear. Simply stated, the notion that individuals who achieve equal access to educational programs will also achieve social equity and academic excellence have no direct correlation. Financial access is only one aspect of an extremely complex set of factors shaping individual and institutional decisions.

Arum & Roska (2011) identified Collegiate Learning Assessment (CLA) dimensions of critical reasoning and writing as indicators of successful undergraduate education. They found that “a national survey of approximately three hundred thousand college freshmen and seniors in 587 four-year colleges and universities found that while 83 percent of freshmen reported that they had *not* written a paper during the current academic year that was twenty or more pages long, 51 percent of college seniors had not done so either. Even at the top 10 percent of schools in this study, 33 percent of college seniors reported that they had not written a paper of this length during their last year in college, p.88”.

Debates separating *access* to education from *quality* of education have been going on for decades. As students examine their educational options, affordability is definitely a concern. A majority of students seek to graduate with the least debt possible since the burden of repaying student loans could decrease their individual and collective ability to live independently or to pursue post-graduate education associated with specific careers or training programs, and ultimately to achieve the quality-of-life to which they aspire. As Astin (2004) discovered, “most academics and many college-bound students and their parents are well aware of the fact that there are only a handful of baccalaureate-granting colleges and universities—perhaps one in 10—that are regarded as excellent or the best, p.323”. Regardless, students choose undergraduate institutions and degree programs for a variety of reasons; location, cost, friends, response to parents, interesting academic programs, internships, career goals, athletics and so forth. This is not a new phenomenon, however, but what is new is the long term effects of poor choices that extend beyond individual choice. Moreover, the impact extends beyond national borders. In a 2008 *Policy Brief* by the Organization for Economic Cooperation and Development (OECD) factors limiting global equity in education include increased migration, educational policies that successfully integrate immigrants and minorities into existing systems, and lack of options that allows students to pursue vocational tracks that provide an option back to more traditional undergraduate or graduate programs. As noted by international comparative data presented in the report “across OECD countries nearly one in three adults have only primary or lower secondary education – a real disadvantage in terms of employment and life chances, p.1”.

A recent movie entitled *The Riot Club* (2014), depicted the indiscretions of a 10 member secret society at an elite, private university. While one individual was selected to shoulder the burden of the group’s debauchery, assault and battery and threatened dismissal from school, a meeting with an alumnus and member of the club, assured that membership was a lifelong commitment, that the scapegoat’s career would be guaranteed, and most of all, was reassured that members of the Club were not the type who made mistakes. This type of loyalty to *alma mater* is not limited to private schools, to secret societies or to members of Greek organizations. These bi-products of education are often part and parcel of the academic experience, if that is a desirable outcome for the student or influential others.

It may be reasonable to hypothesize that not all students seek the rigor, status or assumed homogeneity of students associated with elite institutions, whether they can afford it or not. What is essential is that every student has an opportunity to know that this type of education exists, and to have access to secondary education that leads to eligibility to apply. Small liberal arts institutions are actively recruiting students from diverse ethnic and geographic backgrounds to infuse diversity into their profile, as suggested by Whitesides (2004). This is the type of structural change that shifts theory to practice. In June 2015, Fernando Rojas, son of immigrant parents from Mexico decided to accept an offer to attend Yale University, after having making headlines for being accepted by 8 Ivy League universities (Rocha, 2015).

While this is a great achievement, it seems somewhat shameful that in 2015, this is still an exception, and not more common for children of immigrants or from underrepresented groups.

The question persists as to whether every high school graduate meeting entrance requirements actually has an equitable opportunity to pursue the degree of choice at their preferred institution of higher learning? As noted, equitable access does not equate to program quality- these are different discussions for both students and institutions. If some institutions are cost-prohibitive, then how is a qualified student to obtain access if they cannot pay for it? While the past response has been to provide tax-supported access through federal and state grants, and increasingly less desirable, student loans; the belief that there is no product quality guarantee that accompanies awarded baccalaureate degrees, policy makers are less and less willing to underwrite undergraduate education. The ability to succeed without a degree is reinforced through television shows like *Shark Tank* (US), *Dragon's Den* (UK, New Zealand, Canada, Australia), *Tigers of Money* (Japan), and blockbuster movies like *Slum Dog Millionaire*.

Why invest in an uncertain product in a volatile or unpredictable marketplace? Just like the purchase of lottery tickets, those most marginalized are often those willing to make an investment in luck, rather than protracted education. To make higher education more seductive an option, numerous approaches have been taken. According to Zusman (2011), “as powerful as the anti-affirmative action backlash has been in altering past consensus on access and equity, reduced public funding and changing public expectations pose even more serious threats to higher education participation. If policy makers and higher education leaders in effect ‘change the rules’ just when a new generation of students—less white, less middle class—is prepared to enter college, questions are raised about equity in a democratic society, as well as risks to social stability. Reducing access to higher education also raises concerns about meeting society’s economic and civic needs at a time of increasing technological, economic, social, and political complexity and interdependence. Slowing or even reversing the country’s historic movement toward universal access to higher education is especially problematic because it is being driven largely by governmental and institutional decisions made on financial grounds, rather than by explicit policy decisions on higher education access and participation (p.14)”. Unfortunately, the impact of fewer, as well as less prepared graduates is not limited to a single sub-group of the population, but impact career choice, pay rates, employee benefits and training as well as long term commitments to on-the-job training and education programs that must be absorbed by employers to remain competitive. A different type of backlash has occurred, namely popular demand for a response to claims that higher education has failed everyone. The next section examines some of the ways these allegations have been addressed in the United States.

Repercussions, Reactions, Responses and Remedies

To briefly summarize the preceding sections of this paper, there have been numerous theories and strategies to address issues and concerns with mass education. Some of the more obvious have been standardized testing, assessment of student learning outcomes, online educational programs, remediation and external accreditation. These have evolved in response to allegations that high quality education has not been accessible-whether geographically or financially- to a majority of citizens. This leads to inevitable divisions across society; with fewer able to achieve and sustain the middle-class lifestyle that creates stable families, communities and societies. Reich (2013) summarizes 30 years of watching the labor market and overall standard of living in the United States. One conclusion for his analysis identifies the middle class as perhaps the biggest losers in the unresolved issues of higher education, since flattened earnings for male-headed households, have been replaced by two earners with no net gain in economic status. Beginning in the 1970s, women gained access to education and career preparation beyond gender-typical professions, and now outnumber males as awardees of baccalaureate degrees. For many Americans having a dual-income household has not resulted in overall quality of life gains one might anticipate. Competition associated with variations on global capitalism increase competition, and therefore the desire to be personally and professionally prepared to succeed in that reality. Evidence of on-going tensions among racial and ethnic subgroups, on-going mistrust of labor unions, academic tenure and seniority are all intertwined with faith and belief in educational efficacy. Several responses are described; preparation for the global marketplace, civic engagement, legislation, privatization and metrics.

Firstly, higher education in the United States has increased its preparation of its students for work, leisure and learning in an increasingly *global context*. Approaches vary from courses in the undergraduate core survey requirements, marketplace relevant language courses (e.g. Chinese, Farsi, Tagalog as opposed to French, Greek and Latin), to study abroad, to international internship experiences, as well as institutional policy changes to attract more international students to earn degrees in the US. Jordan (2015) identified homes of international students as primarily from China and gulf nations with “1.13 million foreign students in the U.S., the vast majority in college degree programs... [representing] a 14% increase over last year, nearly 50% more than in 2010, and 85% more than 20015, p.2”. This trend benefits many U. S. American students who would otherwise be unable or unwilling to travel abroad to gain exposure to other countries and cultures. Ironically, the emphasis on the diversification of educational institutions has made some students and their families to embrace a philosophy that if international students come to the U.S., why do they need to travel outside the U.S. – after all, it is expensive and could be dangerous.

A *second* strategy responds to pragmatists who describe education as driven by needs to connect face-to-face with others, whether globally or locally, by using models that have stood the test of time; for instance as exemplified by the long-standing commitment of Jesuit colleges and universities to require students to participate in campus-driven, and course-relevant outreach projects focused on the needs of local communities that combine religious principles of social justice with direct action. Others institutions have followed suit and *civic engagement* has expanded beyond faith-based institutions, however. over time to many levels of public education in the US. Flanagan (2006) has identified the community college level of post-secondary education as a particularly appropriate level since they are the largest and fastest growing sector of higher education, are the most affordable option, and are most egalitarian, serving more than half of all minority and first-generation college students (p. 54). Fried (2012) has suggested that when both curricular and co-curricular domains of higher education work together, the results can be truly transformative for both the learners (including faculty and staff) and for the institution.

A *third* approach may be summarized as *legislative or political initiatives* undertaken by governments to increase youth participation in both paid and unpaid work experiences connected to the philosophy, image and aims of the government. In the US for example, the Peace Corps (founded March 1, 1961 under President John F. Kennedy), Americorps (“We are the Corporation for National and Community Service, a federal agency that helps more than 5 million Americans improve the lives of their fellow citizens through service. Working hand in hand with local partners, we tap the ingenuity and can-do spirit of the American people to tackle some of the most pressing challenges facing our nation”) and more recently, The Edward M. Kennedy Serve America Act Summary Public Law 111-13, enacted April 21, 2009. These strategies extend beyond the classroom, however, as more companies commit to corporate social responsibility programs, *encouraging* if not outright *requiring*, employees to give back to surrounding communities with projects often supportive of educational or environmental goals. Even students from other nations who are enrolled in courses requiring community service or research assignments fulfill the requirement, and are challenged to critique the process both from personal learning and comparative cultural traditions perspectives. These organizations remain relevant and highlight the commitment to social justice as instrumental to career choice and success. Levine (2011) recommends critical analysis of civic engagement, including the conduct of rigorous research on benefits to participants, those served and academic programs, but acknowledged that some initiatives are simply the right thing to do, even though value-driven research is often discredited as biased.

Fourthly, the explosion of education provided through for-profit sources has generated expensive, but tailored options for learners, frequently focused on career preparation. While not traditionally vocational, these programs have as a primary outcome employability, which may compromise broad liberal education-those core knowledge and experiences presumed to be the foundations of common society that inform economic, political and social endeavors. Privatization, in this context, may be viewed as an entrepreneurial response to the demands of the educational marketplace that fills gaps for many learners. As noted by Hentschke (2006/2007), “privatization in education is difficult to isolate not just because there are different types of privatization, but also because those types themselves get comingled in the real world, p 19”. Public higher education systems often provide a for-profit option for students and employees seeking to enhance work-related skill sets and for life-long learners who may not desire grades or academic units for the information, experiences and knowledge they acquire. Certainly offering courses online or in hybrid (partially online and partially “in-person” on campus) is another form of tailoring course delivery to deal with both differences in learning styles and limited classroom and laboratory capacity on high-demand campuses. Naturally, the question arises as to whether or not the for-profit alternative provides parallel content, making it easy for a student to go back and forth between systems, depending upon interest, instructional method, and convenience as well as financial resources. How is comparability assessed and evaluated? In the end, will it make a difference to overall quality of life or to ability to succeed in a chosen career

area? The proliferation of charter schools, private schools As Belfield & Levin (2002) predicted, privatization, was then an emerging trend has now evolved into opportunities to supplement gaps in public education. The authors note that “the different needs present in developed and developing countries means that motive for privatization vary and that the form of privatization adopted is also specific to the country and its economic and demographic situation...privatization programmes are diverse and can be designed to meet several objectives...private education may promote equity, while not all public funding is equitable, p. 7”.

The *fifth* and final response to criticism which seems consistent across levels of education from pre-school through undergraduate is the lack of effective measures. The response to this has primarily been additive; more and different approaches to assessment of learning, more early warning systems to serve as safety nets for students who may fail, reviews by external accrediting bodies to help ensure alignment between education and industry, more standardized measures and tangible evidence of learning in the form of portfolios

But little of this has to do with instilling a love for learning at the individual level - that intrinsic and unquenchable thirst for knowledge and intellectual stimulation. Rather motivation has been prodded by extrinsic motivation- scholarships, job security, professional advancement, pensions, health care and so forth. In The US these are viewed as increasing the scrutiny of higher education by tackling quality from a minimum-standards perspective. Movies like *The Theory of Everything* and *The Imitation Game* offer the opposite end of the spectrum, highlighting the uniquely brilliant mind and what it can accomplish; both as a personal challenge and achievement , as well as contributing to advancing viable solutions for troubling problems; whether national or global in scope. The following conclusions, like graduation, lead to consideration of recommended next steps, and where to begin-commence-once again.

CONCLUSION

In the end, the dilemma seems to be more about making decisions in response to change; something that every generation of educators, at all levels, have faced. The notion that there is information beyond academic institutions is reinforced by the belief that life experience also enriches and complements book-learning. Recognition and acceptance of commitment to life-long learning and continuing education is not new among most professionals; especially those attaining licenses, certification or other credentials associated with fields that continue to evolve to meet the needs of a changing world.

Human beings continue to have choices, but increasingly see higher education as the most legitimate way to attain validation and recognition of what they have learned. Entrepreneurs, artists and techies often bypass this formal affirmation by meeting a need, or creating a demand for or appreciation of something new that can circumvent traditional pathways to success.

The ultimate irony of higher education is how many individuals, including a lot of university faculty members would love to take significant (but calculated) detours from the policies and procedures often misguidedly associated with “academic rigor” in order to support individual learning style and pace. The inefficiency of individualized learning plans that could be designed and delivered in an efficient manner are, in essence, the underlying reason behind the development of mass, public education. However, the end result is the same if there is no common core, philosophy or social purpose underlying education al design, practice and funding, as identified the 2008 OECD Policy Brief, Ten Steps to Equity in Education.

It is not a new idea that individuals expand their knowledge on their own, whether due to desire to improve job performance, prepare for future opportunities, or just to satisfy innate curiosity by being informed. Daily quests for information from a variety of online sources suggest that interest and ability to capitalize on available resources allow individuals to find out what they believe they want and need to know.

All of this said, however, memorizing *Grey's Anatomy* cover-to-cover, watching every surgery posted on WebMD , dissecting lab dummies in the garage and taking weekend intensive seminars may not lead to a licensed physician even when every certifying exam is passed with flying colors? But why not? Michelson & Mandell (2004) recommend the formalization of prior learning as a way to validate individuals' desire for knowledge and hands-on experience that can be translated into academic course credit equivalencies, yet relatively few systems have policies and procedures to achieve this aim, which might both encourage and expedite degree attainment for some individuals. For those with a clearly focused career path this option could improve opportunities for employment placement. Since employers often ask : “Can you do what I want you to do at the level that I wish you to perform it? If you can, do I care why or how you can do it?”. And isn't that the real question being asked and debated throughout higher education today? One can only hope that this current “crisis” in higher education is about more than maintaining a status quo that no longer really exists.

Systems tend to be much more fluid and dynamic than many believe or want to admit. The popularity of Veronica Roth's *Divergent Trilogy* suggests fascination with societies where individuals are born into a sect, or "faction" and allowed to "test out" at a pivotal stage of human development. The movie depicts the conscious imposition of societal roles as similar to the structure of bee colonies. Those who challenged the system eventually learned that their lives were simply part of a social experiment in post-apocalyptic Chicago. Once they freed themselves from the externally-imposed structure, citizens were able to determine who they were and the roles they wished to play, but this came with an added commitment to gain the skills and knowledge necessary to perform. In more open societies, however, where individuals are given choices, some are destined to make the wrong choice and fail in society's eyes. As noted above, the consequences are often borne by others in the society.

The forgoing analysis was undertaken in order to provide support for answering the four study questions posed in the introduction:

Is higher education an individual right and voluntary experience, or is an investment in compulsory education necessary to attaining the greater, common good? (Conscription)

Clearly, the right to education is increasingly seen as a *human right* and one that is designed to fuel individual and societal development. Compulsory, public supported education is provided with conditions and caveats, however. Governments, systems and institutions design outcomes (sometimes with dead-ends) that may be exceeded or not met by individuals. Time and unit limitations or failure determine end of access to tax-supported education.

What is the highest level of formal education that should be supported through public funding? (Crisis)

Increasingly, the baccalaureate or professional vocational degrees are now considered the basis of survival and independence for many nations. Due to an expanded reality of a global community, careers may span and intersect with communities with varied levels of educational attainment. Pressures to retain students once admitted and increase graduation rates often seem to discourage a belief in consistent quality, meaning and integrity of academic credentials. The term "degree mills" is commonly associated with institutions awarding diplomas with limited evidence that students have attained agreed upon level of knowledge and ability to transfer that knowledge to practical settings through competent performance. As Berdik (2008) found, "these days statistics are showing that company CEOs want people who can communicate with others, who have the ability to work as a team and who can speak well. These are skills, p.2). Education must determine at which level students achieve that level deemed acceptable by society-at-large. It seems likely that undergraduate education may be the most appropriate level for most, regardless of chronological age.

Are there common outcomes, metrics and analytics helpful in determining educational effectiveness for all learners? (Continuance)

The underlying assumption for all of the testing, assessment, accreditation and standardized comparisons are often touted as ways to improve learning outcomes, as well as to deliver a known product to employers, communities and societies. Changes associated with implementing findings range from individual change models (tutoring, study habits, remediation, meditation, counseling) to redesign of learning outcomes for professions, educational systems, institutions, academic programs and classroom instruction. Since change is generally slow and incremental, these approaches rarely result in radical transformation of either educational systems or those educated.

Can (should/ will) higher education successfully disconnect learning from lifestyle in order to enhance value of learning and knowledge? (Continuity)

Personal ownership of educational goals and outcomes have been abandoned by any institutions fearing lawsuits, loss of alumni loyalty, inability to place graduates in jobs and general dissatisfaction that can destroy campus morale, while increasing faculty uncertainty about the standards that they should reinforce. If there are no consequences associated with academic endeavor than why bother? In 2004, Whitesides addressed many of the concerns with which we continue to grapple more than a decade later. He challenges higher education to increase content, not just add more as well as to: (1) help students focus on long-term and strategic issues, (2) redefine liberal arts rigor and breadth, including science and technology; (3) take diversity seriously by not dodging or debating issues that are perceived as politically incorrect, (4) rethink the place of information in the university, including effective use of the web, (5) export local educational opportunities into the global marketplace (multi-campus concept) and (6) encourage more focus on the quality and impact on undergraduate education (pp.7-8). Implicit is the understanding that faculty, whether full-time, part-time, tenure track or lecturers, must really *want* to teach undergraduates and be trained and rewarded for doing so. All institutions

can learn from and adapt models from the prestigious universities since all of our graduates are competing for employment and quality of life in the same world. As Chan, Brown and Ludlow (2013) conclude, “notwithstanding the apparent consensus across institutions concerning the purposes and goals of a bachelor’s degree, it may be that colleges and universities do little, if anything to foreground their objectives and, thus, view college students as customers or products for their degree programs. However, if undergraduates were to actively encounter these ambitions in every course and see the connection between their current study and the institution’s lofty ideals, then perhaps misalignments between institutions and students would diminish, p.12”.

Overall, social benefits accrue from a high quality educational system, whether this is the stated outcome or not. Critically examining the social contract of education helps all parties to understand strengths and weaknesses of existing systems, while identifying possibilities for the future. It is clear that for many, the purpose and effort associated with attaining post-secondary degrees has fallen far short of their desired target, but in other places in the world, education is changing lives for the better every day. While some individuals may have lost faith with tax-supported education, as tax-supported education continues along an ambivalent path, the destination of which seems uncertain. This paper has provided evidence of privatized options, which may represent timely, affordable and equitable alternatives. In the end, predominant social values are no longer associated with a single culture, society, or method of delivering education; rather they are aligned with, and emerge from, basic principles of fairness, social justice and life long learning.

RECOMMENDATIONS

Recommendations from the forgoing examination of higher education may be summarized as *critique*, *consultation*, *collaboration*, and *coordination*, all common components of an integrated planning process that combines summative and formative approaches; that is intentional, nimble, transparent and holistic.

- Adoption of international curricula standards and universal competencies; both general knowledge and work-related competencies and active engagement in solving complex problems so that graduates will encounter fewer barriers when seeking entry into diverse labor markets and settings (See Van Damme, 2002).
- Creation of parallel and complementary curricula that allow students (of any age, career stage) to pass seamlessly between traditional higher education programs, professional education and corporate training; transferable, articulated and transportable; Create value, meaning and reward for diverse forms of learning and design systems that translate them into a variety of academic-progress options
- Mandatory educational travel designed “to help us navigate this complex and contradictory world while challenging the limits of our intellectual abilities...casting a vision of global learning that is small enough, immersed enough, ecologically ‘soft’ enough, connected enough, structured enough, cheap enough and hope filled enough to support deep changes in our lives and in the lives of others, Slimbach, p.8”
- Assist students and faculty with celebrating and personalizing commitment to learning, not just receiving a diploma learning; combine with value, meaning and reward for commitment to undergraduate teaching
- Use metrics, statistics, assessments and comparative data to transform, *not shame*. It is highly debated if creating additional “ranking systems” across higher education will benefit institutions, students and society any more than attempting to match students with the best institution for them from the beginning.

The following table depicts possible approaches to higher education that integrates approaches and recommended strategies for future which demonstrate ways in which higher education will continue to be critiqued, a model of consultation at a variety of levels, collaborative and coordinated from both internal and external level.

Table 2 Matrix of Approaches Based on Integration of Educational Phases and Strategies

	<i>Conscription</i>	<i>Crisis</i>	<i>Continuance</i>	<i>Continuity</i>
<i>Higher Education Big Five Competencies</i>	Basic requirement but many forms, inconsistent standard	More review, revision, monitoring	Additive but not necessarily Integrated	Expectations of inclusion in all coursework and learning experiences
<i>Universal Curriculum and Competencies</i>	Broad liberal arts choices; rigor varies	Marketplace driven; vulnerable to “political” pressures	Value-driven, exported, universality considered impossible or impractical due to ideological differences	Comparative examples across the curricular and co-curricular environment
<i>Parallel, Complementary, Transferable, Transportable Paths</i>	Articulation or institution-based decisions (limited)	Limited due to uncertain comparability; questions about content and quality	Structural barriers limit flexibility	Seamless transitions from professional to vocational to traditional education settings and focus
<i>Educational Travel</i>	Not Required by Most Institutions	Recommended	Desirable; discipline specific	Required, sponsored as necessary; may be discipline or career focused
<i>Valuing, Personalizing and Rewarding Commitment to Learning and Teaching</i>	Individual Choice	Philosophically desirable	Historic philosophy, indirectly expressed, nurtured on an individual level	Special selection criteria, training and rewards for undergraduate teaching; research focused on teaching and learning
<i>Transformative Metrics</i>	Testing, Institutional Assessment, Program Review External Accreditation (discipline-specific)	Centralized assessment; closing the loop	Often standardized measures and approaches to facilitate comparisons, rankings, etc. often externally-driven	Metrics, analytics used to inform and focus learning and teaching strategies; Internally driven

Ironically, most of these recommendations can be implemented within existing higher educational structures, in some systems or institution may be in place in some form. Constraints to moving from one phase (or stage) of educational efficacy may be influenced by a number of socio-political factors at the highest decision-making levels. In most cases, as is the case with mandatory educational travel, solutions can be found. Business, industry and non-profit organizations, for example, can direct a portion of their funding to support students in one or more of the targeted areas, particularly in the area of educational travel for those who cannot afford it. Funding opportunities for alumni and professional organizations might fit well with corporate social responsibility initiatives, and so forth. Importantly, these recommendations do not compete with existing educational goals, mission statements, or initiative, but should in fact intensify and focus opportunities for educational excellence. As Mettler (2014) reminds, “from the Northwest Ordinance up through the enactment of Pell grants, the United States found innovative ways to promote higher education so that it would serve crucial and ambitious public purposes. It is now up to us to find ways to do so again, for our own time, p. 200”. And finally, there may be some comfort among students, their families, communities and prospective employees to be able to identify and build upon common educational foundations found all over the world.

References

- AASCU State Relations and Policy Analysis Team. (January 2015). Top 10 Higher Education State Policy Issues for 2015. <http://www.aascu.org/policy/publications/policy-matters/Top10StatePolicyIssues2015.pdf> Retrieved April 7, 2015.
- Arum, R. & Roska, J. (2014). *Aspiring Adults Adrift: Tentative Transitions of College Graduates*. University of Chicago Press.
- Arum, R. & Roska, J. *Academically Adrift: Limited learning on College Campuses*. Chicago: University of Chicago Press.
- Astin, A. W. & Oseguera, L. (2004). The declining “equity” of American higher education. *The Review of Higher Education*, 27, 3, pp. 321-341. The Johns Hopkins University Press. DOI: 1353/rhe.2004.0001.
- Belfield, C. R. & Levin, H. M. (2002). Education privatization: Causes, consequences and planning implications. Paris: UNESCO: International Institute for Educational Planning.
- Berdik, C. (April 17, 2008). What’s wrong with undergraduate education?
- Carey, K. (2015). *The End of College*. New York: Riverhead Books/Penguin Group. Excellence v equity. Special Report: Universities. *The Economist*, (March 28, 2015), 414, 8931, pp. 1-19.
- Chan, R. Y., Brown, G. T. L. & Ludlow, L. H. (2013). What is the purpose of higher education? A Comparison of institutional and student perspectives on the goals and purposes of completing a bachelor’s degree in the 21st century. Association for the Study of Higher education (ASHE) conference, St. Louis Missouri (November 15, Draft Paper).
- Flanagan, C. A. (February 2006). Community Colleges. Youth Civic Engagement: An Institutional Turn. CIRCLE Working Paper 45.
- Freire, P. (2005). *Pedagogy of the Oppressed*. <https://libcom.org/files/FreirePedagogyoftheOppressed.pdf> (30th Anniversary edition).
- Hayward, B. (2014). Exploring provocative ideas for undergraduate education at Stanford. <http://news.stanford.edu/news/2014/may/dschool-undergrad-reimagined-050514.html> Retrieved May 27, 2015.
- Hentschke, G. (Fall/Winter 2006-2007). Privatization in education: Myths, realities, prospects. *Urban Ed*, University of Southern California Rossier School of Education, pp. 17-19. <https://www.usc.edu/dept/education/cegov/focus/leadership/publications/other/Privatization%20in%20Education%20-%20Myths,%20Realities,%20Prospects.pdf>.
- Jordan, M. (March 24, 2015). International students stream to U.S. colleges. *Wall Street Journal*. <http://www.wsj.com/articles/international-students-stream-into-u-s-colleges-1427248801>.
- Keller, G. (1983). *Academic Strategy: The Management Revolution in Higher Education*. Baltimore, MD: The Johns Hopkins University Press.
- Kolb, D. A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, N.J.: Prentice-Hall, Inc. <http://www.learningfromexperience.com/images/uploads/process-of-experiential-learning.pdf> (August 26, 2005; Retrieved June 30, 2015).
- Kolb, A. Y. & Kolb, D. A. (2008). Experiential learning theory: A dynamic, holistic approach to managerial learning, education and development. In Armstrong, S. J. & Fukami, C. (Eds.). *Handbook of Management Learning, Education and Development*, London: Sage Publications.
- Levine, P. (Spring 2011). What do we know about civic engagement? , *Liberal Education*, 97, 2, pp. Association of American Colleges and Universities.
- Mettler, S. (2014). *Degrees of Inequality*. New York: Basic Books.
- Michelson, E., Mandell, A., et al (2004). *Portfolio Development and the Assessment of Prior Learning*. Sterling, VA: Stylus.
- New, J. (September 2, 2014). 'Aspiring Adults Adrift'. <https://www.insidehighered.com/news/2014/09/02/new-book-blames-colleges-many-college-graduates-difficult-adjustment-adulthood>.
- Phillips, D. What is a diploma or degree mill? <http://www.geteducated.com/college-degree-mills-what-they-are-a-how-they-work?tmpl=c...> Retrieved May 27, 2015.
- Reich, R. (2013). *Aftershock: The Next Economy and America’s Future*. New York.
- Rocha, V. (June 8, 2015). Fullerton teen wanted by every Ivy league school chooses Yale. *Los Angeles Times*. <http://www.latimes.com/local/lanow/la-me-ln-fullerton-grad-yale-ivy-league-schools-20150608-story.html>.
- Roth, V. (2011-2015). Divergent Trilogy.
- Slimbach, R. (2010). *Becoming World wise: A Guide to Global Learning*, Sterling, VA. Workshop on the Meaning, Quality and Integrity of Degrees Resource Binder. (January 30, 2015). WASC Senior College and University Commission. Burbank, California: Woodbury University.
- Ten Steps to Equity in Education. (January 2008). *Policy Brief*. Organization for Economic Cooperation and Development. www.OECD.org.
- The Edward M. Kennedy Serve America Act Summary. Public Law 111-13, enacted April 21, 2009. <https://www.ahead.org/nationalserv/Serve%20America%20Act%20Highlights.pdf> Retrieved June 27, 2015.

The Riot Club. (2014). Lone Scherfig/Laura Wade. <http://www.riotclubmovie.com/>.

Van Damme, D. (September 10-11, 2001). Higher education in the age of globalization: The need for a new regulatory framework for recognition, quality assurance and accreditation. Introductory Paper for the UNESCO Expert Meeting. Paris.

Whitesides, G. M. (2004). Undergraduate education at Harvard.

Zusman, A. (2011). Challenges Facing Higher Education in the Twenty-First Century. In Altbach, P. G., Gumport, P. J. & Berdahl, R.O. *American Higher Education in the Twenty-First Century: Social, Political, and Economic Challenges*

<http://www.educationanddemocracy.org/Resources/Zusman.pdf> Retrieved April 7, 2015.

Contingency Between Learning Style Teacher And Student And Its Impact Student'S Learning Outcomes

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ABSTRACT

In connection with efforts to highlight the need to study learning processes, we present results that clearly show the relation between the learning processes pupils and their teachers. The research sample consists of 85 pupils. It was divided into two groups ($N_1=37$, $N_2=45$) on the base of the Mathematics testing results and the teachers of Mathematics. We focused on the sensory preferences measured by the questionnaire "Learning Style Profile Assessment" developed by American authors M. Willis, V. K. Hodson (1999). We found that the relation between sensory preferences – visualization of a student and teacher significantly contribute to success in Mathematics results. It is possible to assume that the contingency between the student's and teacher's learning style is a good predictor of the student's learning outcomes. We consider the mentioned results valuable because this fact is proved even after removing (by partial correlations) the effects of intelligence that has an impact on the success of pupils in Mathematics.

Key words: learning styles, sensory preferences, school success/learning outcomes, intelligence

INTRODUCTION

The educational process is explained not only in terms of content, but also processional one. Whereas, in recent decades psychologists have introduced several new insights into understanding of learning, this knowledge of learning is necessary to apply into teaching, it means into particular processes which teachers can identify with. One way is psycho-didactic approach to the learning and teaching. Psychodidactics does not mean the substitution of pedagogical psychology or didactics, but joint research effort, interaction of psychological and didactic (general and specialized) orientations in establishing and solving problems entering a deeper level of relations between learning and teaching. Psychodidactics explains the educational processes in terms of teaching, that takes into account not only the didactic activities, but also psychological determinants that operate in these activities (Verešová, 2011).

Learning style. Style in learning. Teaching style

Definitions and ways of looking at styles in learning are many, but there is no publication that would submit the issue comprehensively. Styles in learning are the determinants which enter the teaching process by both a teacher and pupil. It is necessary to realize that as we are different in other characteristics, so we can vary in ways how we receive new information, or we learn. We choose those practices that meet us in person. The way of learning is in learning process mostly up to students themselves, whereas we assume that students choose the suitable one themselves or we suggest those ones we use in learning process ourselves because we consider them appropriate and effective ones. We allude to the fact that each student learns in his/her own way and gradually establishes his or her style in learning, therefore he or she is different not only in skills, speed of learning, but also in the preferred method of learning.

Interpretation of the term learning style is presented in literature very unevenly. It is associated with different terms, or substituted by a completely different term. It is often replaced by the term cognitive style. I. Turek (2000, p.85) introduces a definition of both ones. In his opinion, the cognitive style is the way which a person prefers while receiving and processing information. It is mostly gifted, it is difficult to change it and it is only occasionally connected with the context. "Learning style is a complex of procedures that individual prefers in learning in a certain period of his/her life." According to J. Mareš (1998, p. 48) a style "is understood as individually distinct and internally consistent way of selecting and combining of sub-elements and procedures. It offers specific character and for outside observer identifiable and definable characters to the result.

V. Švec's opinion (2002, p. 30) on styles issue is that learning and teaching styles are interconnected and dependent on each other, therefore he describes them together. Style (of learning and teaching) he explains as an integrated, individual characteristic of an activity of the subject (student, teacher). According to V. Švec (2002, p. 30) a learning style is a preferable style of a student which he uses, it is his way of thinking, the way he copes with curriculum, it occurs in learning activities. On the other hand, learning style is a way of seeing the student by teachers, teaching methods, learning, communication, which is reflected in his teaching, reflected in school activities.

He defines learning and teaching styles by some general features:

- they are preferred methods of different processes (learning, teaching) by the subject,
- they belong to the separate category in their motivation, focus, objectives, structure, depth and flexibility to adapt to the teaching situation,
- they have gifted basis but they are being developed during the life of an individual and they can vary to some degree,
- they are typical for a particular student, teacher,
- they partly depend on the content of the activity, the nature of the curriculum, the teaching syllabus.

These general characteristics are, in our opinion sufficient argument that it is not necessary to define and distinguish between the styles in learning, learning styles, teaching styles and styles for the purposes of acceptance of the presented research results. There are currently several hundred questionnaires measuring learning styles and strategies and new ones are still appearing. However, not all of them meet the requirements and they are of different quality, from the renowned to the self-diagnostic on the Internet without giving the author's name.

THE STUDY

Research methods, sample, hypotheses

Research was done among the 85 pupils in ninth grade of primary schools in Slovak republic. For the process of evaluating we have chosen the research sample according to the method Monitor 9/2005. It was the only available method which relevantly measures the school success with the nationwide coverage. For this test it is about the success in Mathematics. National Pedagogical Institute in Slovakia has provided us results related to success of anonymous schools, and we have chosen the schools situated in different "poles of this success chart". Testing tools in Monitor 9 / 2005 had a distinctive character and were aimed at testing student as an individual. For the purposes of selection, we have taken into account the average class score.

Research effort is based on the view that learning in the mathematics are involved:

- level and type of intelligence (constant);
- style of cognition and learning of a student (which reflects the cognitive and affective determinants of learning);
- style of cognition, learning and teaching of a teacher (which also reflects his/her psycho-didactic competences);

The objective of the research problem was to determine correlation between particular thus formulated variables and their determination of results in learning of pupils.

Necessary precondition for achieving this objective were:

1. to verify whether the often declared opinion that there is a strong relationship between achieved results in mathematics education and intelligence of pupils, is based on reality, or rather it reflects the excuse of failures both the teachers and pupils;
2. to find out whether there is a relationship between a teaching style of a teacher and learning style of a student in relation to the success demonstrated by an independent survey (Monitor); (In spite of the fact, we could not examine the teaching style in its complex form, we have reduced the research on its one item, the teaching style of a teacher, reflecting his/her own experiences with teaching Mathematics and we believed that pupils will learn it the same way).

From the Mathematics specifications point of view, the appropriate possibility to determine the teaching style is based on sensory preferences. When receiving information, cognition, a person engages different senses while some of them he/she may prefer more than the others. There is well-known typology which is marked by an acronym VARK, while each letter defines one learning style: visual, aural, read/write, kinaesthetic (N. Fleming, 2001). If student prefers any of the listed learning styles, he/she prefers it not only while receiving information, its presentation, but also during his/her acting, he/she will prefer methods that belong to a particular learning style.

There are currently several hundred questionnaires measuring learning styles and strategies and new ones are still appearing. However, not all of them meet the requirements and they are of different quality, from the renowned to the self-diagnostic on the Internet without giving the author's name. Content is focused on general

learning style, where particular items detect preferences of certain procedures without specification of the curriculum. We have applied a questionnaire “Learning Style Profile Assessment” prepared by American authors M. Willis and V. K. Hodson (1999). We have used its Slovak version. We present only those results relating to the aural and visual preferences, because we believe they are the top in learning Mathematics.

To measure intelligence, we have used the method of test - Test of intellectual potential (TIP), written by P. Říčan. It is a nonverbal method which can be used from the age of 12. It evaluates the ability to derive relations among symbols with the minimal impact of the spatial factor. The result consists on detection of a rule, according to which are ordered three consecutive images, while the pupils were given the task to select the missing fourth variant out of six offered. Test is time limited.

FINDINGS

We found that intelligence is a factor that contributes very significantly to success in school mathematics (see Table 1). When comparing the two files, ie. file "better" and "weaker" we have found out using t-test a statistically significant difference ($t = 4.324$, $p < .000$). Thus marked significant difference (at 0.1% significance level) between both sets was proved right at variable of intelligence.

Table 1 Basic parameters of a variable outcome in the test TIP and significance of differences its averages in schools with better and worse results in Monitor from the Maths

	Better	Weaker	t	p
N	37	48	4,324	<0,001
AM	7,84	5,85		
SD	2,17	2,04		
SE	0,36	0,29		

Legend: N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Since the process and the outcome of the learning process significantly affect the interaction of both teacher and pupil, from an analysis of the following two tables we get the answer to the question whether there is the significant interaction of sensory preferences in relation to success. The results presented in Table 2 are statistically significant confirm, the greater the harmony between the need of the teacher and student, the more successful the pupils are. We may assume that the teacher chooses more appropriate methods which he/she uses on the base of his/her experiences in teaching Mathematics. With the auditory preference (Table 3), this fact was not confirmed. This result can be seen as very significant in terms of the specifics in mathematics, where imagination, associated with the illustration plays a major role.

Table 2 Basic parameters of the variable contrast preferences of visualization among pupils and teachers and the significance of differences its averages in a set of schools with better and weaker results in the Monitor from Mathematics

	Better	Weaker	t	p
N	37	48	4,506	<0,001
AM	-6,22	-23,13		
SD	19,05	15,32		
SE	3,13	2,21		

Legend: N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 3 Basic parameters of the variable contrast aural preferences among pupils and teachers and the significance of differences its averages in a set of schools with better and weaker results in the Monitor from Mathematics

	Better	Weaker	t	p
N	37	48	-1.583	0,059
AM	4,59	10,21		
SD	17,26	15,37		
SE	2,84	2,22		

Legend: N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Analysis of the absolute values (Table 4, Table 5.) above mentioned variables answers the question, of the "direction" in relationship. Statistically significant difference is proved again within preferences of visualization and concerning the results ($t=-2,669$; $p<,00$) we can state that if the visual preference is higher at pupils than the teacher's one, the pupils achieve better results in Mathematics. In other words, if the pupils s have lower visual preferences than their teacher, the result of their interaction is not as positive as when it is the other way round. To conclude this part, interaction between teacher and pupils is confirmed as highly significant factor affecting success.

Table 4 Basic parameters of the variable absolute value of the difference in the aural preferences among pupils and teacher and the significance of differences its averages in a set of schools with better and weaker results in the Monitor from Mathematics

	Better	Weaker	t	p
N	37	48	-0,069	0,473
AM	13,78	23,96		
SD	11,14	13,95		
SE	1,8	2,014		

Legend: N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 5 Basic parameters of the variable absolute value of the difference in the visual preferences among pupils and teacher and the significance of differences its averages in a set of schools with better and weaker results in the Monitor from Mathematics

	Better	Weaker	t	p
N	37	48	-2,669	$p<0,01$
AM	16,49	-23,13		
SD	11,11	15,32		
SE	1,83	2,21		

Legend: N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Concerning the high impact of intelligence, we have decided to eliminate its influence using partial correlation. Table 6 summarizes the relation among particular variables to the success in the Monitor after eliminating the impact of intelligence through partial correlations.

Table 6 Partial correlations between results in the Monitor and obtained data from variables after excluding the intelligence effect

	Success in Monitor
Aural preference	$r = -0,078$
Visual preference	$r = 0,172$
Rate of the difference in aural preferences among pupils and a teacher	$r = 0,073$
Rate of the difference in visual preferences among pupils and a teacher	$r = 0,423^{**}$

Legend: $^{**} p < 0.01$

The analysis table shows that none of the variables correlate after excluding the intelligence effect with success, besides the rate of the difference in visual preferences among pupils and a teacher. After elimination of the intelligence effect, as a significant factor influencing success in Mathematics, visual preference among pupils is higher than the teacher's one and pupils achieve better results in Mathematics. This fact can be interpreted as a fact that interaction of sensory preferences of pupils and a teacher has a positive impact on their results in Mathematics. Mentioned interaction is possible only in case that teacher is competent to diagnose the sensory preferences and at the same time the teaching styles.

CONCLUSIONS

We consider as very important results, which clearly confirm the suitability of the interaction of teaching styles of the teacher and student, as well. The above findings demonstrate the need to review the didactic approach to take in account the psychological determinants, too. With reference to mentioned fact we would like to point to the possibility of a new approach to the teacher preparation (Mathematics), leading to the development of teaching skills to develop pupils' interactive activities, experiential learning, and activating methods. Use of interactive activities substantially alters the role of teachers. In this sense, the teacher is not seen as the one who transmits ready knowledge and shows the only right solutions and processes. We think these are issues and opportunities that only in a very limited extent are used in pre-gradual teacher training in the context of direct link to special didactics.

References

- Fleming, N. (2001). *VARK a guide to learning styles*. <http://www.vark-learn.com/english/index.asp>
- Komárik, E. (2002). *Metódy vedeckého poznávania človeka*. Bratislava: UK.
- Reid, J. M. (1998). *Understanding Learning Styles in the Second language Classroom*. Upper Saddle River, NJ: Prentice Hall Regents
- Švec, V. (2002). *Stýly učení žáků a možnosti jejich rozvíjení*. In *Vybrané kapitoly z obecné didaktiky*. Brno: PF MU.
- Turek, I. (2004). *Inovácie v didaktike*. Bratislava: MPC.
- Verešová, M. et al (2011). *Does empathy alone account for prosocial behaviour in school?* Psychology & Health, 26, Suppl. 2, 232.
- Willis, M. Hodson, V. K. (1999). *Discover your child's learning style. Children learn in unique ways – here's the key to every child's learning success*. California: Prima publishing.

Data Better Understanding By Using Of Interactive Visualization Tools

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ABSTRACT

The objective of this study is to make a research of JavaScript libraries providing the most effective methods of data processing. We analysed eight web-based visualization tools for data rendering. There are amChart, D3, Flotr2, Google Chart Tools, Charts.js, NVD3, Vis.js and ZingChart. Few tests for the three datasets with different values were performed. Loading time and time of rendering were tested for each library. The tests were repeated several times and the average of results was calculated. Different web browsers were used to compare the distortion caused by them.

This paper is a first part of our research. We need a tool for better visualization our data which is taken from an algorithm for time estimation of software product development. Testing of these web-based tools should help us to choose the most appropriate library. Based on these tests a web application for data processing will be created. Additional possible usage of application can be in teaching of software engineering, statistics, mathematics, physics or economics. The interactive representation of data will be helpful for students to understanding and analysing of their collected data.

INTRODUCTION

Data visualization can help to understanding of meaning in a large volume of data. Visual interpretation is used for scientific analysis of complex data. Many problems have been solved with this approach. Visualization of data makes it possible for researchers, analysts, engineers, and students to understand these data in an efficient and effective way. Human visual system can detect patterns and other variations in very short time. Visualization was considered for improving the scientific process (Wijk, 2005).

This paper was created as an initial analysis of a project which is focused on creating of an online tool for data visualization as charts. There are a large number of the JavaScript libraries for a work with interactive charts. Eight libraries were chosen, all of them had fulfilled our requirements. Namely AmChart, D3, Flotr2, Google Chart Tools, Chart.js, NVD3, Vis.js and ZingChart were analyzed and tested. We focus mainly on testing of time of data rendering. Based on this research new web application will be created. The user will gain important information clearly and comprehensibly. Finally, the application may be helpful both in research and teaching process.

In section "Parameters for the charts" some of the most widely used web visualization tools were described. The parameters for choosing of libraries were also determined. Section "Comparative methods" explains our testing methods, data for testing and chart test environment. In section "Conclusion" our conclusion from performed testing and analysis were presented.

PARAMETERS FOR THE CHARTS

Eight libraries were tested. All of them had fulfilled following requirements: free license for non-commercial using, basic charts types, fast time for rendering and customization (see in Table1).

The libraries must meet also these requirements:

- Clear processing of results,
- Easy connection to custom data,
- Support of all modern browsers,
- Ability to interactively edit this chart.

There are two main formats of JavaScript solutions for rendering charts. First technology is based on HTML5 Canvas and second are VML and SVG technologies. Differences between these two technologies are a pixel drawing with SVG, and a vector drawing with Canvas (Kaipainen, 2009), (*SVG vs canvas: How to choose* [online]). AmCharts, D3, NVD3 use SVG and VML technologies, while Flotr2 and Charts.js use HTML5 Canvas and Google Charts, Vis.js and ZingChart use HTML5/SVG technology to provide cross-browser compatibility.

There is a summary of these technologies:

Canvas

- Pixel based
- Single HTML element <canvas>
- Modified through script only

- Performance is better with a larger number of objects (>10k) (*SVG Tutorial* [online])

SVG

- Shape based
- Multiple graphical elements, which become part of the DOM
- Modified through script and CSS
- Performance is better with smaller number of objects (<10k) (*HTML5 Canvas* [online])

Framework Name	AmCharts	D3	Flotr2	Google Chart	Charts.js	NVD3	Vis.js	ZingChart
License	Free or commercial	The BSD 3-Clause License	The MIT License (MIT)	Creative Commons Attribution 3.0 License and Apache 2.0 License	The MIT License (MIT)	Apache 2.0 License	Apache 2.0 and The MIT License (MIT)	Free or commercial
Rendering Technologies	SVG, VML	SVG	HTML5 Canvas	SVG, VML and HTML5 Canvas	HTML5 Canvas	SVG	HTML5 canvas and SVG	HTML5 canvas, SVG, VML

Table 1: There are description of the license and rendering techniques for selected libraries.

Selected libraries:

- AmCharts - It is based on SVG rendering technology. It contains many types of charts (column, bar, line, area, step line, smoothed line, candlestick, pie and donut, radar, polar, scatter, bubble charts) (*JavaScript Charts and Maps | amCharts* [online]).
- D3 - SVG was used for data visualization. D3 allows to full support for modern web browsers. Xcharts, NVD3, Rickshaw, Cubism.js and dc.js are based on D3 framework. There are extensive documentation and a lot of examples (*D3.js - Data-Driven Documents* [online]),
- Flotr2 - It allows create graphs and charts with HTML 5 Canvas. This is a successor of Flotr which includes many improvements. The main advantage of this library is speed of drawing because HTML5 canvas is using instead SVG (*Flotr2* [online]).
- Google Chart - These charts are based on pure HTML5/SVG technology (adopting VML for old IE versions). It has everything from simple line charts to complex hierarchical tree maps; the chart gallery provides a large number of well-designed chart types (*Charts | Google Developers* [online]).
- Charts.js - Chart.js uses the HTML5 <canvas> element for visualizing. On offer are six visualization methods (line, bar, radar, polar area, pie and donut chart) (*Chart.js* [online]).
- NVD3 - This is based on D3.js framework. It allows to build charts and chart components from D3.js (*NVD3 Re-usable charts for d3.js* [online]).
- Vis.js - Vis.js is using HTML5 Canvas so as SVG for rendering. It is great tool for display networks visualization but there are other great modules with many options of other charts (*Vis.js* [online]).
- ZingChart - This library uses a combination of HTML5/SVG technology. There are a many types of charts (column, bar, line, area, step line, smoothed line, candlestick, pie and donut, waterfall, maps, mixed, bullet radar, polar, scatter, bubble chart and others) (*JavaScript Charts for Big Data - ZingChart* [online]).

COMPARATIVE METHODS

In the performance testing, various large volumes of data were needed. Random generated data has been used for tests in three different sizes. There are 1 000, 10 000, 100 000 values. The data were converted into a specific format for each tool such as JSON or Array. All the measurements were done in three most common used web browsers as Google Chrome, Mozilla Firefox and Internet Explorer. All tests were run on Fujitsu Esprimo P710 E85. All examples of libraries on test web page were uploaded. WebPageTest (*WebPageTest* [online]) was used for measuring of page loading time. This online application calculates Load Time and First Byte Time (*Quick Start Guide - WebPagetest Documentation* [online]). We were able to determine the fastest library by this information.

- The Load Time - it is time from start loading page until the entire page was loaded (*Quick Start Guide - WebPagetest Documentation* [online]).

- First Byte Time - it is time when the age started loading the page until the first response of the server arrived (*Quick Start Guide - WebPagetest Documentation* [online]).

The test was performed 10 times and calculated an average because times were slightly different (see in Figure 2.). We have reviewed the connection speed that could affect the test results. Download speed was 38.6 MB/s and Upload speed was 4.9 MB/s. A simple interpretation of the data into a line chart from each library was chosen. Unnecessary things as legend, title, axis name and animation were removed. It could distort the final data.

	amCharts	D3	Flotr2	Google Charts	Charts.js	NVD3	Vis.js	Zing Charts
Dataset 1 000	1,9353	2,0155	1,1571	1,9081	0,7991	1,7273	1,4225	1,9345
Dataset 10 000	2,567	2,133	2,216	2,553	2,174	5,827	2,190	2,562
Dataset 100 000	2,171	3,952	32,876	2,499	1,807	50,907	7,131	2,237

Table 2: Results from testing

At first the dataset with 1 000 samples was used. When these low number of values were loaded the differences between rendering modes cannot be recognized. Times of rendering was almost the same for all libraries. Dataset with 10 000 values was used as a second. In these values it is possible to recognize the differences in reaction of the libraries. Rendering time of most libraries are around 2.5s. NVD3 library had highest time of rendering (over 5s). It is still very good results for quick response . Charts.js had the best processing time for the dataset with 100 000 values. The libraries amCharts, Google Chart and Zing Chart were very similar time around 2.5s. D3 and Vis.js had a little longer rendering time but it still is acceptable standard. NVD3 and Flotr2 had a longest rendering time (over 30s). It is not usable for large data volumes.

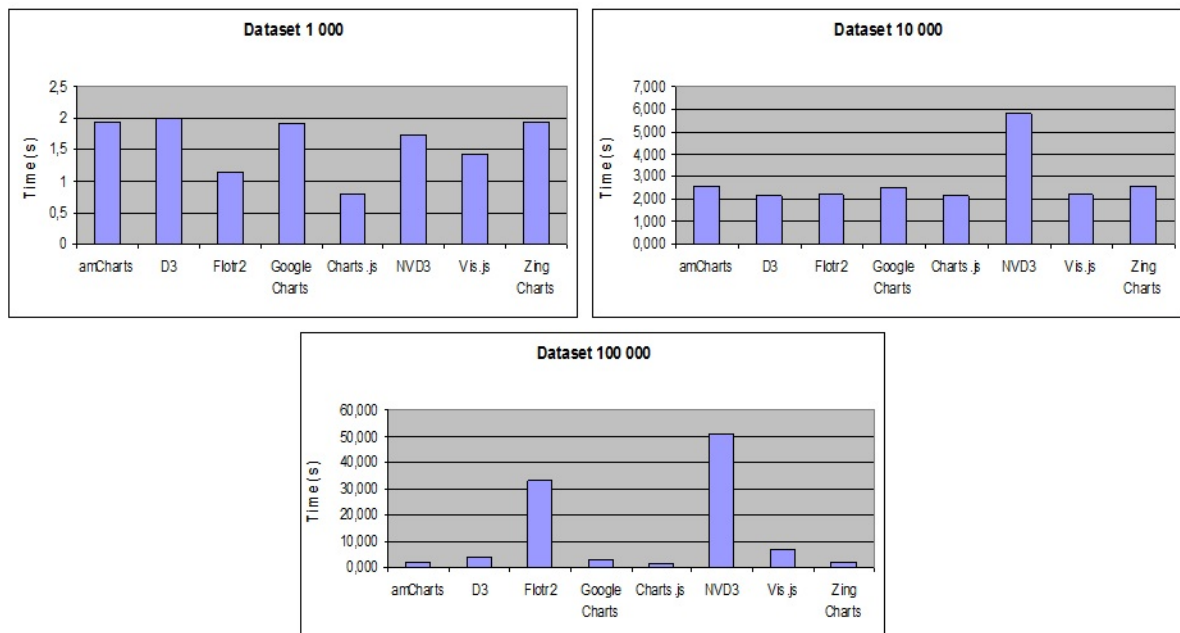


Figure 1: Compare rendering time of visualization tools

CONCLUSIONS

The goal of this survey was finding the best web-based tools for a large volume of data visualization. Selected library was able to rendering the necessary data in graphs in a short time. The results show that each visualization tool has other advantages and parameters. There were differences in the quality of supporting documentation, customization options and many types of charts. Well written and detailed documentation allows the user to work with the library more easily.

Libraries AmCharts and Charts.js was chosen. They reached very good score in the term of tested parameters. This libraries have a large and helpful documentation. Libraries are based on two different rendering methods

namely SVG and HTML5 Canvas. They will be implemented into our web application. Google Chart and ZingCharts also reached good score in the test but first two mentioned has easiest implementation.

The further research will be continued at developing of a web application. With this tool, users will be able to understand their data with interactive presentation. A web application will be allowed to users view results and improved estimations time of developed software. This application may be used in teaching of statistics, mathematics, physics or economics. The interactive display of data can be helpful for students to understand and analyze their collected data.

References

- D3.js - Data-Driven Documents. (n.d.). Retrieved June 29, 2015, from <http://d3js.org/>
- Flotr2. (n.d.). Retrieved June 29, 2015, from <http://www.humblesoftware.com/flotr2>
- HTML5 Canvas. (n.d.). Retrieved June 29, 2015, from http://www.w3schools.com/html/html5_canvas.asp
- Charts | Google Developers. (n.d.). Retrieved June 29, 2015, from <https://developers.google.com/chart/>
- Chart.js. (n.d.). Retrieved June 29, 2015, from <http://www.chartjs.org>
- JavaScript Charts and Maps | amCharts. (n.d.). Retrieved June 29, 2015, from <http://www.amcharts.com/>
- JavaScript Charts for Big Data - ZingChart. (n.d.). Retrieved June 29, 2015, from <http://www.zingchart.com/>
- Kaipiainen, S., & Paksula, M. (2009). SVG vs. Canvas on Trivial Drawing Application. In: *In 7th International Conference on Scalable Vector Graphics*.
- NVD3 Re-usable charts for d3.js. (n.d.). Retrieved June 29, 2015, from <http://nvd3.org/>
- Quick Start Guide - WebPagetest Documentation. (n.d.). Retrieved June 29, 2015, from <https://sites.google.com/a/webpagetest.org/docs/using-webpagetest/quick-start-guide>
- SVG vs canvas: How to choose. (n.d.). Retrieved June 29, 2015, from [https://msdn.microsoft.com/en-us/library/ie/gg193983\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/ie/gg193983(v=vs.85).aspx)
- SVG Tutorial. (n.d.). Retrieved June 29, 2015, from <http://www.w3schools.com/svg/>
- Vis.js. (n.d.). Retrieved June 29, 2015, from <http://visjs.org>
- Wijk, J. (2005). The Value of Visualization. *VIS 05. IEEE Visualization, 2005*. Retrieved June 29, 2015, from <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1532781>
- WebPageTest. (n.d.). Retrieved June 29, 2015, from <http://www.webpagetest.org>

Day-Time-Based Evaluation Of Television Broadcast In Turkish Culture Over Its Approach To Public Education: Media Ethics, Corporate Social Responsibility And Some Tv Programs

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ABSTRACT

According to 2012 report of RTÜK (Radio and Television Supreme Council), the following are the daily mean television-watching durations: house wives watch TV for 4.2 hours a day, retired people watch TV for 4.3 hours a day and the unemployed watch TV for 3.9 hours a day. Television-watching rates are reduced at the weekends. (<http://www.rtuk.org> : 10)

Majority of day-time viewers comprise the house wives in the community. Families with medium income and lower income turn on the TV as soon as they wake up in the morning as a general attitude and behavior so much so that except for natural disasters, the TV in the house is turned off if a sad event occurs or if someone passes away. The broadcast is naturally cut generally in case of a natural disaster; for example, in case of an earthquake mostly due to insufficiency of infrastructure. And in such case, you cannot get informed about the situation that you are experiencing or what is happening to other people.

One may not sit and watch TV throughout the day necessarily but the general behavior is that television is always on like a window that is opening up to the world outside as a one-way communication tool even when a person is doing house work. Sometimes this communication may turn into a conversation between two deaf people. A house woman may give an answer to the person talking on TV or to a conversation on TV; she may get emotional by an image on television and talk to herself about that. Majority of women in our society tend to ‘talk to herself’. The communication that house wives establish with television should be researched in a multi-directional way, statistical data should be collected and analyzed.

The purpose of this article is to analyze the responsibility that the sector of television broadcasting takes with regard to public education in the context of media ethics and corporate social responsibility, to make predictions within the diversity of entertainment medium which has developed and changed in the 21st century and to remind the television producers, broadcasters, presenters and announcers the fact that *they will strengthen their own future if they take on responsibility and that they will exist if the society exists* and all of these should be considered keeping in mind that house wives and especially mothers keep television on in their houses or in their neighbors when they go to them. It also aims to make people think that one can help society to develop by contributing to its education and that it might make people happier.

Key Word: Turkish Culture, Television, Broadcasting, Media Ethics, Radio and Television Supreme Council, European Broadcasting Union, Public Service, Corporate Social Responsibility, Public Education, Public Service, Individual Ethics, Ethical Intelligence

INTRODUCTION

Historians have defined centuries as the phases that divide the human history. As the borders of culture and civilization have expanded and communities and nations have gotten closer, the changes that used to occur in centuries started to occur in semi-centuries, quarter-centuries and then decades. Today, we see by experience that big changes occur within five or ten years (Ünlü, et. al., 2003;7). But how can these changes occur in political, socio-cultural structures of communities in such a fast and consecutive way? Maybe it is time to harvest the seeds of changes that ‘some’ have planted and again ‘some’ have desired to harvest. This is the subject of history and geography and world history and geography tells this to us. This article will be also partially related to change although it is restricted to its title.

Hüseyin Rahmi Gürpınar, who has a prominent place in Turkish literature and who lived between the years of 1864 and 1944, defined his purpose of producing literature-art by having said that: *“The purpose of literature and art is to provide benefit to the society. Authors should be benevolent people who think about and know the requirement that they should spread their scientific and artistic power to the farthest corners of our towns and villages.”* (Ünlü, et.al., 2003;25)

The author who was born in Istanbul in 1844 and passed away in 1964 had seen the collapse of a huge empire and establishment of a new state. The intellectual man who was born in a community, the literacy rate of which

was only 5%, had to take on responsibility for its society. As “human is a creature which has awareness of history” (Ortaylı, 2008: 9), the author had felt this responsibility and made such a definition. In Turkish Republic, the population was approximately fourteen million people in 1927 and the female population was higher than male population until 1945s. (Kongar, 1998: 523) This explains the reason why the ratio of literacy in women was lower. However; girls started to be able to go to middle school starting from 1862. (Ünlü, 2003:19) It should also be kept in mind that reading was considered by the Catholic Church as a work of satan. (Briggs;Burke, 2011:69) Today education of girls is still promoted with campaigns such as ‘Let’s Help Kardelens Go to School’. The sociologist Emre Kongar says that “Ottoman Empire could not produce an ideology for independence based on its own dynamics and resources during its collapse. They out-sourced it (from French Revolution)” (Ünlü, vd., 2003:54) The reason why I have cited these sentences is that each society’s historical processes are unique just like individuals and therefore their solutions to problems should be unique, heart-felt and a result of a serious consideration, reading and observations. If they do so, achievement seems inevitable.

CULTURAL FUNCTIONS OF MASS MEDIA

One of the most interesting discourses about the cultural life of modern people is the statement that was made by the Dutch culture historian Johan Huizinga about philosophy of culture as a result of his long-term studies in late 19th century and early 20th century (Oskay, 1993: 145).

According to Huizinga, banal exaggeration of economic interests has led to our conditioned worship to technological development. After it killed all the unknown and secrets, our worship to technological development occurred as the product of rationalism and pragmatism that forgives unclean and guilty human. However; the same rationalism and pragmatism forgot to save humanity from social imprudence and narrow-mindedness and shaped the world according to banality of such humanity (Oskay, 1993:149-150). This was evident in all areas. In other words; upon modernism; material interests, cynicism, pragmatism and rationalism stood out and commercialization, professionalism, organization and instrumentalization became more introvert; that is, it caused every new ‘player community’ that emerged disappear. Modern human stayed alone with rude sensationalism. The thinker did not make these criticisms only based on sociology and economy. He did as a culture historian and a humanist who is also affect by being a linguist (Oskay, 1993:149-150). He was able to define the opinions which encompass the 21st century, a century ago and formulated them as the most competent one.

‘Escape’ of Huizinga: He is such a humanist thinker that he was able to become aware of the fact that people who are desperate against life in modern society *never give up wanting the better*. People who cannot give up on such longing prefer escape which is the only way that the system has left open for them. The one that is escaped from determines the quality of the escape and says that the reason of such escape is the prevention of works that could be done in big social transformations (Oskay, 1993:156-157).

“Witnessing is a common but rarely examined term in both the Professional performance and academic analysis of media events. Media institutions have enthusiastically adopted its rhetoric, especially for nonfiction genres such as news, sports, and documentary. Media personae such as correspondents and newsreaders can be institutionalized as witnesses, cameras and microphones are often presented as substitute eyes and ears for audiences who can witness for themselves.” (Peters, 2009:23)

CORPORATIVE SOCIAL RESPONSIBILITY

The world is for the first time has a system which is based on market economy in countries, the majority of which have democracy regime. Economical, technological and political developments led to an increase in interdependency of people on the world. Institutions have as important responsibilities as the individuals for development and maintenance of the level of well-being. (Argüden, 2002:9)

In broadcasting, each country has its own regulatory rules. It is RTYK (Radio and Television High Council and RTÜK (Radio and Television Supreme Council). RTYK emerged after September 12 in 1983 as a regulatory council when private radio and television were not present. It occurred as a supervising council that protects the state’s interests against partisan utilizations of broadcasting. In Turkey, private broadcasting started from satellite and took advantage of legal gap. (Mutlu, Erol vd.,2001:111) Upon execution of the Law about Establishment and Broadcasting of Radio and Television numbered 3984 based on the change in the Constitution in 1994, RTYK was abolished and RTÜK (Radio and Television Supreme Council) was founded. (Mutlu, Erol vd.,2001:112-113). “RTÜK is a powerful institution which is essentially authorized to perform regulations, grant permission and license and to implement penalties with regard to radio and television companies.” (Mutlu, Erol vd.,2001:117)

The concept of corporate social responsibility (in West) was not available in literature yet but the importance that is given to this subject and interest in the subject is pretty new. As the *reason for its occurrence*, that is the consumers, had lost their confidence in organizations, leaders and economy with scandals such as Enron, WorldCom, Parmalat, Qwest, ImClone; the concepts such as ‘business ethics’, ‘corporate management’ stood out (Aktan, 2007:11).

A lot of social responsibility projects that were carried out by public institutions and organizations, private companies, a range of non-profit foundations and non-governmental organizations have been translated into life in Turkey so far (Aktan, 2007:147). It is a new concept for Turkey and it has not arisen from its own dynamics. European Broadcasting Union (EBU) defines the public service in the field of broadcasting as follows: “Public service is the act of meeting needs of all the layers of a community by the establishment which is obliged to do it without discriminating the different sections of the society.” In other words, not being under the influence of groups that consider their own interest and politics; EBU defines the public service broadcasting organization which broadcasts in this regard as follows: “They are general or private legal independent institutions that are recognized by state per legal regulations.” Despite all the problems that the concept has; equal access, balance and principle of objectivity are of priority. A broadcasting institution that has been organized as a public establishment must be equally accessible by everyone in the society, should offer a balanced range of program types according to functions of education and entertainment and should aim at objectivity of policy and balance (Avşar; Kaya, 2013:43-44). European Broadcasting Union (EBU) is an independent and a non-profit, non-governmental organization which has contributed to the development of international radio and television broadcasting. It offers a platform where the broadcasters all around the world can exchange their radio and television services and especially news and programs (Karadağ, 2006:219)

Corporate social enterprises are big-scale activities that are undertaken by an institution in order to support social purposes and to complete corporate social responsibility liabilities. (Kotler; Lee, 2006:3) Just like ‘Kardelenler’ campaign of Turkcell.

The speed and popularity of visual and audio communication tools that are called digital media have positive and negative effects on communities in economical, social, cultural, political and psychological senses. Legislation of communication should not also be excluded from technological developments. Moreover; Turkey’s mass media legislation has to be complied with the mass media legislation of European Union (Çiftçi, 2008:214).

THE IRRESISTABLE APPEAL OF TELEVISION OVER THE 21ST CENTURY FROM KIA

Television reinforces its message with image and as it helps eliciting a certain thought and opinion by bringing image into the forefront, it is a stronger technique of public relations compared to other written communication techniques (newspaper, magazine, books and radio etc.) (Çağlar; Kılıç, 2006:173).

It can be used as a radio but except for some cases, while the topic that the person is interested in is broadcast on TV, that person does not do anything else and watches it so it creates a visual perception and therefore its power in creating a culture cannot be denied.

21st century will be a century when the perceptions will be guided over images: it will be a century when people will be endowed with computers, smart phones and tablet computer, in other words, with smart devices and images which stand out in this century is related to the increasing rise of violence because ‘*the critical, self-led human thought*’ that we accept as the basis of humanity develops only if *literacy* is present. Human is a product of *literacy*. Collapse of printed culture means rise in violence. (Sanders, 2010:10) 21st century will be also a century when the perceptions will be led over images and “an eye that sees is not only a physical organ”. Also, it is also a tool of perception which is conditioned by the tradition in which the person has grown up (Mlodinow, 2013: 47). You can add all the senses to that because the eye will be the most important one.

DAY DREAMS FROM ‘MS. APPEAL’...

The audience of the day-time television programs in Turkey primarily in national channels comprises the house wives. According to RTÜK, public opinion, Broadcasting Investigations and Measurement Office Directorate, Television Watching Trends Research 2012 report, those who watch programs that target women prefer mostly Kanal D by 48%, Show TV by 12.6% and ATV by 12%. Briefly, according to RTÜK, public opinion, Broadcasting Investigations and Measurement Office Directorate, Television Watching Trends Research 2012 report, the weekday and weekend daily average television-watching durations are as follows: housewives watch TV for 4.2 hours, the retired people watch TV for 4.3 hours and the unemployed watch TV for 3.9 hours. Television-watching rates are reduced at the weekends. (RTÜK: 10) When the weekday daily mean television-watching durations are analyzed according to income level, it can be seen that as the income level increases, the

duration that is spared for watching TV decreases (RTÜK:10) “In the research that was made in 2009, when the daily average television-watching during the weekdays are analyzed, it can be seen that the retired and the unemployed watch TV approximately for 5 hours and housewives watch for approximately the same amount of time (RTÜK: 10). When the daily average television-watching during the weekdays are analyzed, it can be seen that those who are not well-educated watch TV for 3.8 hours, those with medium education watch for 3.5 hours and those who are well-educated watch TV for 3.5 hours (RTÜK:9). When the daily average television-watching during the weekends are analyzed, it can be seen that there is not much difference. Those with income 5.001 TL and more watches TV for less than 3.8 hours, those with income between 2.001-3.000 TL constitute the group that watches TV for the longest durations with 4.6 hours a day on average. In a study that was made in 2009, it can be seen that as the income level increases, the duration that is spared for watching TV decreases. Five income groups that are between 0 and 2000 TL watch TV for 4.5 hours on average.” (RTÜK:13)

Television is still the one that is used the most but tablet use has been increasingly rising. The one that is sold the most among computer devices is tablet computers (www.teknolojioku.com)

When the connection between the frequency of watching TV and the amount of income are analyzed, it can be seen that, in all the income groups, *Turkish soap operas and news are preferred more* (RTÜK)

The confidence in media is gradually decreasing and media has some ethical problems and these problems cannot be solved with principles and/or rules. It is not possible to understand this without investigating the political, economical and organizational dynamics of the media. (Çaplı, 2002:7) The most predominant one among these dynamics probably can be understood if it can be seen that “Machiavelli’s pragmatist and flexible understanding of ethics that foresees doing everything to achieve” (Çaplı, 2002:7) is prevalent in today’s television. When it is considered that, especially in media sector, the main purpose of big companies, company groups and holdings is to make profit, there is a very small area left for ethical practices (Çaplı, 2002:10).

And this explains to us why the programs on TV are so similar or tend to be similar. For example; if there is a scene about committing suicide in the soap opera ‘Kara Ekmek’ which has high ratings and if it has attracted high rating, the viewers encounter a similar scene in another soap opera the following week. Tabloid popularity is a word that has been used by Bülent Çaplı and that describes the situation very well; however, this tabloid popularity is not static; it is kinetic or dynamic. It depends on ‘rating metering device’. Today, there are similarities between the scenarios of two soap operas that are broadcast on ATV like the poisoning in Kara Ekmek was also covered in Bedel.

“Series or local TV dramas which are the most important and common formats of TV carry the functions of a certain or dominant ideology in terms of their structures and contexts. Life styles and characters presented in TV series are effective enough to avoid the breakdowns or explosions that may occur by providing support for the already working structure of social life in a sense with its function in process of creation of individuals in harmony with the society, integrated with the system.” (Yıldırım, 2008:113)

Defense of conflicting values in TV series: Competition ethics: All the values other than ownership, inequality and ‘Market’ Institution are open to criticism. (Oskay, 1992: 71). For a person to be a good communicator, he needs to be interested in not only history, economics and sociology but also literature and other branches of art (Oskay, 1992: 71). However; the public/community is not even aware of the fact what it is used for and what it is turning into.

When it is considered in respect of corporate social responsibility, private channels stand out more with regard to considering only commercial interest. Although it is not that obvious for TRT channels, channels’ competency to act as the corrector in respect of Turkish language usage has weakened. TRT Institution is independent per constitution but not by law. In area of radio and television broadcasting, independency means that program productions, management and economics are free from political power (Çiftçi: 215)

During the process of compliance with EU through RATEM (Radio and Television Broadcasters Professional Union), the master-apprentice relation was ended with MAYESER (Professional Proficiency Certificate Center) and an environment where those who are educated in this area can work was created. (<http://www.ratemakademi.org>) TRT okul (TRT School) is the most positive channel in respect of corporate social responsibility. TRT school: What do we say? What do we understand? program contains the talks of three thinkers on a topic that they determine and it is the only philosophy program in private/legal TV channels. It is possible to encounter the repetitions of the program that is broadcast late at night.

An example of corporate social responsibility from Kanaltürk is the ‘Elden Ele’ program on Wednesdays that is broadcast once a week. Corporate social responsibility has been becoming more important; it has become a fashion. The trailer of the program and the commercials include social responsibility messages so it can be considered an appropriate program.

The studies that are conducted by scientists show us that: The homogenous quality of television is thought over, produced and broadcast to reach the highest number of viewers that is possible for general programs. They find formulas that can be easily accepted by the highest number of viewers and they cover those programs (Öztuna, 1992:198-199) “The purpose is to just have the highest outcome.” (Erdoğan, 2005:66). The quality of the formulas that are found for them to be easily accepted by the highest number of viewers is wrong. Formulas that are based on wrong assumptions will constitute the topic of another program.

On the program that is broadcast on TV 8, that is *İşte Benim Stilim*, the violence and the language of offense that was dominant on May 18 (2015) started to decrease and become normal as of May 18. As the ratings of the program were high, a similar program which included Chloe as she also speaks Turkish in a cute way due to her foreign origin just like İvana Sert and the wife of a famous signer whose only quality is being a former model, started to be broadcast under the name of ‘Bu Tarz Benim’. Similar actions that are made for profit thinking that everything can be done for profit. When something receives high rating, a similar program is broadcast on another channel and/ or it is added and its miscode as if it was a correct and normal behavior; this is a wrong formula. The way Nur Yerliş speaks Turkish is way more inappropriate than that of İvana Sert. And as a content, it is not nice either. The intonation is based on a format that is full of offense and she told Sima Şerafettinova who has stated to be 17 years old and therefore who has not taken legally responsibility yet that she is “unfortunately a sick premature baby”. One of the definition words that she uses is ‘spaghetti’. For day-time programs and 21st century people, eye is not only a physical organ anymore but it is a tool of perception and when children are subject to such words, they grow up and even if we look a lot, we cannot find a person who would say that I take responsibility for the society that I was born into instead of ‘money’ and I reject using this language. On the contrary, we encounter people with the 21st century mind-set who say that we would do anything to have higher rating (May 26, 2015 Beyaz TV, *Söylemezsem Olmaz* Program, Lerzan Mutlu) and unfortunately the viewers seem to be rather unprepared and like having been imprisoned for life.

CONCLUSION

It is obvious that we have been programmed to be ethical. The fact that ethical behavior is not peculiar to humans and we share it with other species may indicate that our ethics originates from the fact that we live as social groups. As a member of a social community, we need help from others to survive and grow up. (Lennick, Kiel, 2005:30) Hüseyin Rahmi Gürpınar was born between 1844 and 1864 in the 19th century and he could still consider doing good deed. We are in the 21st century and only a century ago, this was possible. The prototype of the 21st century: hedonist, as capitalist and ignorant as possible. In a research that was made among media workers, one of the participants had expressed his/her feelings by saying that “... This sector is based on relationships of interest and benefits so much so that people do not have any expectation from their family in material and spiritual sense, feeling the sincerity is an important feeling of confidence (Republic of Turkey Prime Ministry, 2010: 98).

Yalçın Doğan, while speaking about a real event that had happened in South America – this story is about a reporter who made a leader who had passed away as if he was still alive just for the sake of success of the revolution and its presentation through press, said that: “There is an important question that comes to our mind immediately with this example. Does a community which holds such a power in its hand really acts according to that responsibility? Then what is the responsibility area of that community? What is the responsibility area of those who hold these tools in their hands? How and where should this be used? This is a philosophical question (Foundation of Financial Researches. 1994:15). What could happen if the Free Market order that is dominant today had been applied to media sector? It is seen as a good in the market order and its communication is defined according to rules of ‘Market’ (Atılğan, 2001: 233). This is what dominates the day-time women programs today. Corporate social responsibilities can only be a make-up. They can be seen as a rising value and they can be endured for high profit for a short period of time. Then they can be thrown into waste of capitalism.

The principles and rules in the media can become applicable. Let’s get help from a philosopher and according to Confucius who thinks that knowing how to treat others is a virtue, the morals are based on *inner ethics* and this enables all the problems and discomforts in life to be removed. Confucius explains internalization of ethics by ‘not doing to others that you would not want to be done to you’ (Çaplı, 2002:14). Then the ethics of big holdings, companies and executive board chairman should change. Those people should stop considering the people in their community as bugs or objects and should remember frequently that they are the people of the same

community. They should ask themselves frequently how they would feel if they were regarded as cows that are milked.

Business ethics and corporate social responsibility should not be used to increase the confidence of consumers that was lost due to scandals. Each society should structure its own corporate social responsibility itself, modernize its own core and should believe in that from the heart. What is said there is that each country should regularize its own corporate social responsibility considering its own inner dynamics and should do that feeling motivated inside; that would be better to improve the future of the community. What distinguishes communities between each other is their cultural structures. Each community can contribute to that. Its name does not have to be derived from corporate social responsibility. How much are these improvements that are made to enter the European Union (EU) compliant with us? However; a name that is based on the culture of the community can make people feel more motivated, help them understand more.

No one takes responsibility about the harms and effect of media. Studies that are conducted in this area are not even taken into consideration. They think in the *format* that “The dogs bark but the caravan goes on”. The new trend is *Let’s play some corporate social responsibility*. How can we get rid of this mindset? Maybe, we should not see the people with whom we were born in the same community as objects. How do we see the community? Who are these people? What do we look at them like this? Who are we? Could the ‘Market of Ideas’ in the enlightenment period be a solution? According to Meril, when personal requirements and preferences are in conflict with social or mostly corporate requirements and choices, a middle way should be found. (Çaplı, 2002:15) In multi-cultural countries like ours where the right and wrong get mixed up easily, this is a belief that says that the right will prevail. People can do it with their own will and intelligence (Çaplı, 2002:22-23). The right can be fixed with codes to the human. The 21st century does not give this opportunity to the viewer. Let me remind the fact that in communities like ours that has been introduced with printing recently and whose educational level is already low, people are already confused and therefore do not know where to stand and to develop an awareness over what they see. “All the moral concepts and systems are based on something and societies change. (Tekinalp; Uzun, 2004:61)” EBU says in this regard that “... while each country’s media system is shaped according to itself, the public service and communication of this broadcasting institution with the government is established in line with its system. It is obvious that as the social and political structure changes depending on countries, each country’s mass communication system and institutional policies for broadcasting should reflect its social and political structure. This inevitably causes as many broadcasting system as the number of countries to arise.” (Avşar; Kaya, 2013:43-44)

What is left off of the right? In our communities which have disintegrated in a standard way, it can occur only as a result of conflict and struggle (Crouch, 2011:179, 196). Understanding of corporate social responsibility has been adopted as a trend (Almanak.2010:13).

“Media has actually been a subject of market and commerce. It is naturally so and it is inevitable. However; it should be such an institution within the community that can be used as a milestone that just like a university it can provide the communication and other communication tools of the society can be evaluated according to that milestone.” (Soysal, 2010:132)

‘Public service broadcasting model’ is still being used in European Economic Community (Gül, 2013:46). World organizations are making effort to regulate visual-audio area. For example UNESCO pointed out that the researches that have been made about the discussions of ‘New Information and Communication Order’ has not been achieved because of the intervention of developed countries and mentioned two main results: discussions provided underdeveloped environment for saying what they think in international platforms and became a guidance for preparation of laws and legislations (Gül:183).

Visual media or radio and television are completed through broadcasting of sound and image and receipt of the broadcasting via receiver technology. Therefore; news, comment, criticism or declarations reach masses. Visual media is communicated through live broadcast or as recorded. Offense to personal values through value broadcasting cannot be prevented during broadcast and the offense becomes more effective through live broadcasting. Difference is obvious in respect of responsibility scales and detection of amount of damages (Köseoğlu, 2013:17).

Corporate social responsibility or voluntary community improvement activities are similar to raising a baby in communities like us the educational level of which is low and this would mean for TV world to kill the goose that lays the golden egg. How long are we going to raise the baby? Who decides that? Who will decide that? Where is the media ethics? Where does it stand? And where will it stand? Who decides that? Who will or should

decide that? To whom are they going to broadcast those commercials? And the money that flies away? Money? Are viewers a tool to gain money, a cow to milk? How much taking responsibility of public education can be exaggerated? Overdose would surely be dangerous. In such case, people who are enlightened, especially housewives may decide not to spend their lives before TV and get into life. They can get accustomed to culture and art activities and may explore more useful hobbies other than the TV just like attending NGOs, doing sports, gardening and walking, if not anything. Some of them may get into political arena and it has been recently experienced (AKP) and it has become effective but still the majority of them are still sitting at home before TV.

The ethics of 21st century people seems to need serious inquiry and re-structuring. Maybe the problems is originating from the way we interpret Darwin's 'Natural Selection' and 'Survival of the Fittest'. Become stronger than others, be supreme and you can do anything for that. Our country which is famous for adapting things to its own culture may adapt broadcasting to itself. In subjects which do not require individual ethics in developed countries which are protected by law, the things may get so overrated in my beautiful country that they may use the television and information medium in order to increase ratings, people may used to steal subject of new TV programs, movie subjects, word usages and unbeknown to people, their diaries and ideas may be stolen making them 'the victim of modern times'. Ideas which may bring trillions of money. It would be a complete Texas environment and there is nothing which would prevent that, other than the personal (!) ethics; and people do not have that.

But does it bother people? Nuray Sayari who is a very popular astrologist makes people in the studio, who might be coming from a cast agency, repeat the following positive suggestions: "I am, from this moment on, opening my energy area. I intend that everything that is good for me and the entire community continue in my life and I allow that." <http://www.beyaztv.com.tr/program/isin-asli/> *It is obvious that it will be good for the person who makes people repeat those words and the program producer. "... May that luck always be with those who are always with us"* İşin Aslı 23.03.2015 Nuray Sayari <http://www.beyaztv.com.tr/program/isin->

References

- Aktan, Coşkun C.; Börü, Deniz /2007), Kurumsal Sosyal Sorumluluk, İstanbul: İGİAD Yayınları.
- Argüden, Yılmaz(2002), Kurumsal Sosyal Sorumluluk, İstanbul: ARGE Danışmanlık Yayınları.
- Atılğan, Semra(2001), Marmara İletişim Dergisi, , İstanbul: M.Ü. İletişim Fakültesi Yayını, Sayı:11
- Avşar, Zakir B.; Kaya, Elif Emre(2013), Medyanın İffeti, Ankara: Altınpost yayıncılık.
- Briggs, Asa; Burke, Peter(2011), Medyanın Toplumsal Tarihi, Gutenberg'ten İnternete, İstanbul: Kırmızı Yayınları.
- Çaplı, Bülent(2002), Medya ve Etik, İstanbul: İmge Kitabevi.
- Crouch, Colin(2011), Neoliberalizmin Garip Ölumsuzlüğü, Çev. Uğur Gezen, İstanbul: Polity Press.
- Çağlar, İrfan; Kılıç, Sabiha(2006), Genel İletişim, Ankara: Nobel Basımevi.
- Çiftçi, Ahmet(2008), RTÜK, İletişim Şûra'sına Sunulan Tebliğler,(20-21 Şubat 2003), Ankara: Baskı: Ofset Fotomat.
- Erdoğan, İrfan(2005), İletişimi Anlamak, Ankara: Pozitif Matbaacılık.
- Gül, Ayşen Akkor(2013), Görsel-İşitsel Politikasıyla Avrupa Birliği: Televizyon Yayıncılığından Yöndeşen Medyaya, İstanbul: Beta Yayınları.
- İktisadî Araştırmalar Vakfı(1994), Kitle İletişim Araçları ve Kamuoyu-Seminer, Tebliğler-Panel, İstanbul: İktisadî Araştırmalar Vakfı Yayını.
- Kalaycı, Ahmet Rasim(2010) Yay. Haz., Medya Profesyonellerinin ve Medyanın Aile algısı, Ankara: T.C. Başbakanlık Aile ve Sosyal Araştırmalar Genel Müdürlüğü
- Karadağ, Gökmen(2006), AB'nin Medyası Medyanın AB'si, İstanbul: İstanbul: Güncel Yayıncılık.
- Kongar, Emre (1998), 21. Yüzyılda Türkiye, 2000'li Yıllarda Türkiye'nin Toplumsal Yapısı, İstanbul: Remzi Kitabevi.
- Kotler, Philip; Lee, Nacy(2006), Kurumsal Sosyal Sorumluluk, Çev., Sibel Kaçamak, İstanbul: Kapital Medya Hizmetleri A.Ş.
- Köseoğlu, Bilâl(2013), İletişim Saldırılarından Doğan Hukuksal Sorumluluk ve Uygulama, Ankara: Bilge Yayınevi.
- Lennick, Dou; Kiel, Fred(2005), Etik Zekâ, İş Performansının Artırılması ve Etik Zekâ, İstanbul: Soyak Yayınları.
- Mlodinow, Leonard(2013) Subliminal: Bilinçdışınız Davranışlarınızı Nasıl Yönetir? İstanbul: Okuyan Us Yayınları.
- Mutlu, Erol; Çaplı, Bülent vd.(2001), Medya Politikaları, Ankara: İmge Kitabevi.
- Ortaylı, İlber (2008), Tarihimiz ve Biz, İstanbul: Timaş Yayınları.
- Oskay, Ünsal(1993), XIX. Yüzyıldan Günümüze Kitle İletişimin Kültürel İşlevleri, Kuramsal Bir Yaklaşım, İstanbul: Der Yayınları:114.
- Oskay, Ünsal(1992), İletişimin ABC'si, İstanbul: Simavi yayınları.

- Öztuna, Güner(1992), Yazılı, Sözlü, Görüntülü,(Written, Oral, Visual Communication Media Studies) Basın Yayın İletişim Bilimleri, İstanbul: M.Ü. Teknik eğ. Fak. Döner Sermaye İşletmesi, Matbaa Birimi.
- Peters, John Durham(2011), Media Witnessing Testimony In The Age Of Mass Communication, Edt. By Frosh and Amit Pinchevski, İstanbul: London: Palgrave Macmillian.
- Sanders, Barry(2010), Öküzün A'sı, Ayrıntı Yayınları, İstanbul.
- Soysal, Mümtaz(2010), Gazeteciler Cemiyeti, Ulusal İletişim Kongresi 2010, Ankara: Gazeteciler Cemiyeti Yayınları.
- Tekinalp, Şermin; Uzun, Ruhdan(2004), İletişim Araştırmaları ve Kuramları, İstanbul: Derin Yayınları.
- Ünlü, Mahir; Özcan, Ömer(2003), 20. Yüzyıl Türk Edebiyatı 1900-1940, I. Cilt, İstanbul: Anka Basım.
- Yıldırım, Sumru(2008), Yenibinyılda İletişim Sempozyumu Volume 1, Hosted By İstanbul University. İstanbul: Lazer Ofset.
- Almanak'09, Kurumsal Sosyal sorumluluk Gözlemevi İstanbul Bilgi Üniv. Halkla İlişkiler programı, Kurumsal Sosyal Sorumluluk Gözlemevi 2009 öğrencileri,İstanbul: Novel Yayıncılık.

Television

Beyaz TV, 26 Mayıs 2015: 'Söylemezsem Olmaz Programı'

Internet

- <http://www.rtuk.org.tr/Home/SolMenu/25#> RTÜK, Kamuoyu, Yayın Araştırmaları ve Ölçme Dairesi Başkanlığı; Televizyon İzleme eğilimleri Araştırması - 2012
- <http://www.teknolojioku.com>, 12/09/2013
- <http://www.ratemakademi.org.tr/etkinlikler/mesleki-yeterlilik-sertifikasi.aspx>

Determinants Of Satisfaction In Palliative Care Patients

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ABSTRACT

Evaluation of patient satisfaction has had a growing importance on health quality, planning, rationalization of process management and health resources. Furthermore, the scarcity of studies on palliative care and the increase in average life expectancy associated to the increase of patients with chronic conditions that need palliative care, add to the need of research in this area. **Objective:** To analyze how sociodemographic variables, clinic variables and quality of sleep relate with patient satisfaction in palliative care. Through a cross-sectional, quantitative study, we enquired a random sample of 83 Portuguese patients in need of palliative care participated, most of them admitted in ULS (Local Healthcare Units) (37,7%), females (50,6%), with ages between 38 and 93 years ($M = 70.95$; $Sd = 12.77$). A clinical sociodemographic sheet was created and used instruments such as ESAS - Edmonton Symptom Assessment System, EORTC In-Patient Satisfaction with Care Questionnaire (In-PATSAT32) and OSQ - Oviedo Sleep Questionnaire were also used to measure the variables. The sociodemographic and clinical variables that showed a statistically significant effect in the satisfaction of Patients in palliative care were: younger patients, living in urban areas, with higher income and that are admitted in UMDR (Medium Stay and Rehabilitation Unit) present the highest satisfactions indexes. Regarding sleep quality, the patients with higher satisfaction referred less insomnia, hypersomnia and general sleep satisfaction and higher subjective sleep satisfaction. The results seem to indicate that to monitor the patient's satisfaction it's invaluable to appreciate its variables. Further research and professional education about their influence on healthcare's quality is suggested.

Keywords: Patient satisfaction; Palliative care; Symptoms; Sleep.

INTRODUCTION

There are several diseases that lead to a terminal condition which would beneficiate from palliative care such as oncological diseases, degenerative central nervous system, organ failure, dementia and other. These, when advanced and in fast progression, become complex and lead to a progressive deterioration of their physical state and eventually their death (Pereira, 2010).

Traditionally, the care of individuals at the end of life had a focus on his death, the soul was more relevant than the body. Nowadays, importance is given to all that is going to change his quality of life, give dignity and provide autonomy while respecting the value of life (Sousa, 2012; Misko, 2012).

According to the World Health Organization (WHO), it is relevant to apply palliative care as soon as possible as it provides relief from symptoms, incorporates psychological and spiritual features, upholds life and regards dying as a normal process, neither hastening or postponing it, provides support to both patients and family, enables a life as active as possible, uses a team approach and promotes the increase of quality of life (WHO, 2015). The foundations of palliative care are symptom control, adequate communication, family support and team work (Othero & Costa, 2014).

In Portugal, the rate of people in need of this care at the end of life is between 307,17 and 467,52 per 100.000 people, including adults and children (World Palliative Care Alliance & WHO, 2014). However, Portugal ranked 38th when evaluating availability of end-of-life care. This is a rank by Economist Intelligence Unit (EIU), who studied 40 countries according to their end-of-life care. According to it, Portugal has also one of the lowest rankings of public awareness of end-of-life care (2 in a scale of 1 to 5, in which 5 is the highest) and one of the lowest positions in the quality of death index (31st), behind South Africa and in front of South Korea (EIU, 2010).

The healthcare team has been focusing on the patient's symptomology. Investigation reveals that there isn't a systematic monitoring of symptoms: there are several and professionals don't use instruments that would enable that evaluation and posterior control (Ribeiro, 2012; Sousa, 2012). Other focus has been the quality of sleep since it's associated with health and quality of life. There's a substantial percentage of patients in palliative care with sleep disorders (Sousa, 2012).

Symptoms, treatment, longer lives alongside diseased, limitations caused by the disease, knowledge and uncertainty have a physical and psychological impact on the individual and family. That way, it is easy to understand the importance of symptom control, adaptation to loss of abilities and emotional support. These will influence how the patient perceives the situation and his own satisfaction (Misko, 2012; Nunes, 2014; Othero & Costa, 2014).

Patient satisfaction is increasingly important to the evaluation of quality of healthcare services since it enables the planning and management of procedures and resources. Because of this, institutions are increasingly valuing and promoting patient's contribution to the process (Costa, 2011).

It's easy to comprehend that patients and family wish to have autonomy, clear communication, dignity and a sense of control in decision making. Only then can patients classify the care received as positive (Alderman, 2013).

PROBLEM STATEMENT

There's a need for investigation in this area because there's a lack of studies focused on patients in need of palliative care and their caregivers. It is also relevant to consider determinant factors such as the increase of life expectancy, lasting chronic and disabling diseases, change of palliative care principles, importance of patients contribution to the evaluation of quality of health services and the reduced number of published articles that approach this subject in Portugal (Santos & Capelas, 2011).

RESEARCH QUESTIONS

The research questions are "What is the level of satisfaction of patients in need of palliative care with nurses, doctors and organization of such care?" and "How do sociodemographic, clinical and quality of sleep variables influence the level of satisfaction of patients in need of palliative care?"

PURPOSE OF THE STUDY

The main purpose is to analyze the link between sociodemographic, clinical and quality of sleep variables and the satisfaction of patients in need of palliative care.

RESEARCH METHODS

A cross-sectional and quantitative study was made to analyse the link between independent variables that are sociodemographic, clinical or about quality of sleep (independent variables) and the level satisfaction of patients in need of palliative care (dependent variable).

This study was made amidst a broader school project by Escola Superior de Saúde de Viseu (centre of Portugal) with the title "Investigation in palliative care: contribution for a better care", a teamwork dynamic between teachers and students.

Participants

Participants were gathered through a non-probabilistic sample of 83 patients, mostly female (50,6%), with a median age of 70,95 years ($Sd= 12,770$). Inclusion criteria: chronic, oncological and palliative patients, hospitalized in continued or palliative care units or even at home with palliative care criteria (limited life prognosis, intense suffering and problems/ needs of difficult resolution that demand specific organized and interdisciplinary support), conscious and oriented and able to communicate or to fill the instrument.

Patients were hospitalized in Continued Care Units (UCCI), Palliative Care Units (UCP), Local Health Units (ULS), Medium Stay and Rehabilitation Units (UMDR) or at home but with and history of recent hospitalization to receive palliative care.

Instrument

To collect the data, a questionnaire was used as a research instrument. It was divided in three sections: one with the sociodemographic characterization, the second with the clinical characterization and the third with the circumstantial characterization. This last one includes the Edmonton Symptom Assessment System (ESAS), EORTC In-PATSAT32 (to evaluate satisfaction) and Oviedo Sleep Questionnaire (OSQ).

Describing according to the last 24 hours, the ESAS analyses nine symptoms (pain, tiredness, nausea, depression, anxiety, somnolence, appetite, wellbeing and breathlessness) but a tenth can be added. The symptoms are rated on a scale of zero to ten, in which ten is the maximum intensity (Monteiro, 2009). In the global perspective, 0-27 was considered as a light symptomology, 38-54 moderate and 55-80 as severe. It has a good global Cronbach's alpha, of ,898.

EORTC In-PATSAT32 approaches satisfaction according to what the patient feels about the medics and nurses technical ability, interpersonal ability, information given and availability. Other professionals, waiting time, access, exchange of information, comfort and global perception of care are also rated (EORTC Quality of life Group, 2001). It's a Likert scale using 32 items with six options possible: the higher the points, the higher the satisfaction. For each subscale, the Cronbach's alpha was very good, varying between ,904 and ,975.

Using a 15 item scale of which 13 may be joined in three categorical scales is QSO. These three categorical scales are: satisfaction with sleep (one item), hypersomnia (three items) and insomnia (nine options which will also rate its gravity). They are in a Likert scale: the first item goes from one to seven and the rest from one to five. In each scale, the score sits between 9 and 45, in which the latter is the most severe. The other two remaining items inform about parasomnias, organic disturbances and type/frequency of sleep aids (Figueiredo, 2012). There's a good global Cronbach alpha of ,888.

Procedures

The investigators coordinated the application of the questionnaires. The data was collected between April first and the 13th of June, 2014. Afterwards, the statistical treatment was made through SPSS (Windows), applying descriptive methods and parametric and non-parametric tests.

Ethical principles and norms were upheld: this study was approved by the Ethics Commission of Escola Superior de Saúde de Viseu, institutions were asked for permission so that it could be applied on their patients, their respective informed consents stressing that it was voluntary were signed, and privacy and anonymity was maintained throughout the collecting and using of data, encoding the questionnaires and assuring privacy when answering.

FINDINGS

Participants Descriptive analysis

The 83 participants are patients in need of palliative care, majorly women (50,6%) with an age between 38 and 93 years, average 70,95 years ($Sd= 12,770$) and a coefficient of variation (CV) of 18,00%, suggesting a moderate dispersion (Table 1).

Table 1 – Descriptive statistics on age and gender

Age Gender	n	Mi n	Ma x	M	Sd	CV (%)	Sk	S/error	K	K/error	p
Male	41	46	93	68,7 8	12,62 8	18,36	,108	,369	-,984	,724	,02
Female	42	38	91	73,0 7	12,69 8	17,38	- 1,044	,365	,569	,717	
Total	83	38	93	70,9 5	12,77 0	18,00	-,448	,264	-,618	,523	

Recoding age in three classes, we determine that 32,5% have 64 years or less, 31,3% have between 65 and 78 years and 36,1% have 79 or more years. The representative age group in males has 64 years or less (41,5%) and in females has 79 years or more (42,9%).

Most of the respondents is single, divorced or widowed (50,6%), the others are married or in civil union. The percentage values presented by the female group are proportionally identic to those of the overall sample. Most of them live in a rural area (65,1%), live out of the district of Viseu (75,9%) and the values presented by each gender have a similar representation to those of the overall sample.

Analysing education, 45,8% of the sample is illiterate, 44,6% have been in school between the 4th and 9th grade (basic education) and 9,6% have been in the 12th grade or higher (secondary or higher education). The male gender presents higher academic qualifications (12,2% with 12th grade or higher) than the female gender (7,1%).

Most of the individuals isn't professionally active (54,2%). When analysing per gender, the males are mainly active (68,3%) but the main part of the females are not (76,2%). Most of the respondents refer a monthly family income equivalent to the national's minimum wage (75,9%), something that has similar representation in both genders.

Concerning religious beliefs, 94,0% of the individuals say they practice some kind of religion, data that has a equivalent representational percentage value in both genders.

Regarding clinical characteristics, 33,7% are hospitalized in a ULS, 25,3% in a UCCI, 13,3% are at home, 12,0% in a UCP and 4,8% are somewhere else. Men are mostly in ULS (21,7%) and women in UCCI (15,7%). Overall, and with representation in both genders, most of the patients are hospitalized because of an oncological disease (67,5%).

Most of the respondents have been hospitalized for less than two weeks (35,5%), data also seen in the male gender (22,2%). However, most of the females have been hospitalized for more than seven weeks (20,6%). Overall, most of the patients say they've had previous hospitalizations (63,9%, with representation in both genders), three or more times (39,6%).

Most say that the disease begun before 2012 (54,12%), data that is also verified in the female gender (30,1%). On the other hand, males refer that the disease has begun since (and including) 2013 (25,3%). Other diseases exist in 55,4% of the respondents (26,5% male and 28,9% female). These include diabetes mellitus type 2, hypertension, hypocoagulation, cataract, hypercholesterolemia, anemia, epilepsy, depression, chronic kidney disease, deep vein thrombosis, stroke and atrial fibrillation.

About the severity of symptoms, these are mentioned from worst to lighter: tiredness (41,0%), pain (39,8%), appetite and wellbeing (equally 37,3%), anxiety (34,9%), depression (31,3%), somnolence (30,1%), breathlessness (28,9%) and nausea (16,9%). Overall, females predominantly refer light and moderate symptomology (both 35,7%) and males mention moderate symptomology (36,6%). The general intensity of symptoms is lower in females ($M= 39.40$; $Sd= 21.09$) than in males ($M= 41,34$; $Sd= 21.09$) (Table 2).

Table 2 - Descriptive statistics of symptoms intensity.

Gravity per gender Symptoms	Male						Female						Total					
	Light		Moderate		Severe		Light		Moderate		Severe		Light		Moderate		Severe	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Pain	1	31,	1	29,	1	39,	1	28,	1	31,	1	40,	2	30,	2	30,	3	39,
	3	7	2	3	6	0	2	6	3	0	7	5	5	1	5	1	3	8
Tiredness	9	22,	1	41,	1	36,	1	23,	1	31,	1	45,	1	22,	3	36,	3	41,
		0	7	5	5	6	0	8	3	0	9	2	9	9	0	1	4	0
Nausea	2	53,	1	29,		17,	2	54,	1	28,		16,	4	54,	2	28,	1	16,
	2	7	2	3	7	1	3	8	2	6	7	7	5	2	4	9	4	9
Depression	1	39,	1	29,	1	31,	1	45,	1	23,	1	31,	3	42,	2	26,	2	31,
	6	0	2	3	3	7	9	2	0	8	3	0	5	2	2	5	6	3
Anxiety	1	34,	1	26,	1	39,	1	42,	1	26,	1	31,	3	38,	2	26,	2	34,
	4	1	1	8	6	0	8	9	1	2	3	0	2	6	2	5	9	9
Somnolence	1	39,	1	29,	1	31,	1	40,	1	31,	1	28,	3	39,	2	30,	2	30,
	6	0	2	3	3	7	7	5	3	0	2	6	3	8	5	1	5	1
Appetite	1	34,	1	24,	1	41,	1	40,	1	26,	1	33,	3	37,	2	25,	3	37,
	4	1	0	4	7	5	7	5	1	2	4	3	1	3	1	3	1	3
Wellbeing	1	24,	1	36,	1	39,	1	40,	1	23,	1	35,	2	32,	2	30,	3	37,
	0	4	5	6	6	0	7	5	0	8	5	7	7	5	5	1	1	3
Breathlessness	2	48,		17,	1	34,	2	61,		14,	1	23,	4	55,	1	15,	2	28,
	0	8	7	1	4	1	6	9	6	3	0	8	6	4	3	7	4	9
ESAS Total	1	29,	1	36,	1	34,	1	35,	1	35,	1	28,	2	32,	3	36,	2	31,
	2	3	5	6	4	1	5	7	5	7	2	6	7	5	0	1	6	3

Regarding the sleep pattern, subjective satisfaction with sleep varies between 1 and 7 ($M= 4,23$; $Sd= 1,34$) and hypersomnia varies between 3 and 15 ($M= 6,83$; $Sd= 3,56$), both with a high dispersion around the average and statistically significant differences ($p= ,000$). This is not the case with insomnia, which is not statistically significant. Most of the patients say they don't have problems while sleeping. When they exist, males refer nightmares 1 or 2 days or 3 times per week (both 24,24%) and females refer snoring 1 or 2 times per week (21,4%). Most of the patients take sleeping pills 6 to 7 days per week (49,4%), with a representational percentage in both genders (46,3% in males and 52,4% in females).

Satisfaction with doctors, nurses and organization of care was analysed. There's a higher average satisfaction with nurses' interpersonal abilities ($M= 61,5$; $Sd= 21,35$) and lower satisfaction with doctor's availability ($M= 45,93$; $Sd= 26,13$) and with waiting time ($M= 45,93$; $Sd= 22,10$) (Table 3).

Table 3 – Descriptive statistics of satisfaction.

Satisfaction	n	M	Sd
Doctor	83		
Interpersonal abilities		50,40	25,80
Technical abilities		47,29	24,32
Information		46,29	26,81
Availability		45,93	26,13
Total (Satisfaction)		47,62	24,01
Nurse			
Interpersonal abilities		61,75	21,35
Technical abilities		59,54	21,35
Information		54,42	23,40
Availability		57,38	23,75
Total (Satisfaction)		58,27	20,90
Other professionals		50,50	22,78
Waiting time		45,93	22,10
Access		46,39	22,47
Exchange of information		48,80	22,40
Comfort		51,50	24,49
Global perception of care		61,14	21,48

Concerning doctors, patients are more satisfied with their interpersonal abilities ($M= 50,40$; $Sd= 25,80$). With nurses, they are less satisfied with the information given by them ($M= 54,42$; $Sd= 23,40$). Satisfaction with overall perception of care has the highest average score ($M= 61,14$; $Sd= 21,48$) but waiting time has the lowest ($M= 45,93$; $Sd= 22,10$).

There's also a positive Pearson's correlation ($p< ,05$) between the items of satisfaction with doctors and nurses and subjective satisfaction with sleep. However, the correlation is negative between the items of total satisfaction with doctors and insomnia, total satisfaction with nurses and insomnia and between satisfaction with doctor's interpersonal abilities, techniques, total satisfaction and overall satisfaction with sleep.

The results are statistically significant between: subjective satisfaction with sleep and satisfaction with other professionals, waiting time, access, exchange of information and comfort; insomnia and satisfaction with other professionals, waiting time and exchange of information; hypersomnia and satisfaction with other professionals and waiting time; overall satisfaction with sleep and waiting time.

A positive correlation ($p< ,05$) exists between satisfaction with care organization and subjective satisfaction with care and a negative correlation between those same items and insomnia, hypersomnia and overall satisfaction with sleep.

Inferential analysis

We also studied the link between satisfaction and age groups: there's only a statistically significant result between satisfaction and waiting time ($p= ,038$). The highest mean rank is among those with 64 years or more ($\bar{r}= 51,24$) and lowest in those that have more than 79 years ($\bar{r}= 36,87$) (Table 4).

Table 4 - Kruskal-Wallis test between satisfaction of patients and age and between satisfaction and habilitation.

Age	≤ 64 years $65-78$ years ≥ 79 years			<i>Kruskal-Wallis test</i>	
Satisfaction	\bar{r}	\bar{r}	\bar{r}	X^2	p
Waiting time	51,24	38,33	36,87	6,565	,038

Habilitation	UCCI	UCP	ULS	UMDR	Home	Other	<i>Kruskal-Wallis test</i>	
Satisfaction	\bar{r}	\bar{r}	\bar{r}	\bar{r}	\bar{r}	\bar{r}	X^2	p
Doctor								
Information	29,31	49,50	41,64	61,25	45,73	35,88	14,112	,015
Availability	31,60	48,11	41,63	61,56	39,51	43,50	11,864	,037
Total (Satisfaction)	31,73	50,67	42,02	61,45	38,91	36,00	12,016	,035
Nurse								
Interpersonal abilities	36,33	51,61	36,16	57,00	43,95	34,63	11,389	,044
Information	31,55	53,56	37,13	61,95	48,45	37,38	15,605	,008
Availability	36,64	55,17	38,45	59,20	41,45	23,88	12,296	,031
Total (Satisfaction)	34,11	56,56	37,20	59,80	44,45	28,63	12,908	,024
Waiting time	31,19	55,06	39,20	63,50	42,27	24,50	17,249	,004
Access	32,52	51,39	37,98	62,92	48,14	29,50	15,947	,007

Through the Anova test, we gathered a statistically significant result in which age influences satisfaction with waiting time ($p< ,05$), but the percentage of explained variation is weak (8%). Other statistically significant results were gathered, related to satisfaction with doctor's information, availability and total satisfaction, with nurses' interpersonal abilities, information, availability and total satisfaction, with waiting time and access ($p< ,05$). The highest mean rank is the one for satisfaction with waiting time from patients in UMDR ($\bar{r}= 63,50$) and the lowest is one for satisfaction with nurses availability from patients in other institutions ($\bar{r}= 23,88$).

Also using the same test, we determined that there are higher averages of satisfaction in UMDR, between 6,77 ($Sd= 6,02$) and 75,83 ($Sd= 19,42$), and lower ones in UCCI, from 32,54 ($Sd= 26,86$) to 56,75 ($Sd= 25,50$). Except for nurses interpersonal abilities, all the mentioned items of satisfaction have a statistically significant F test ($p< ,05$), so the institution will influence patients satisfaction. The percentage of explained variation is weak (between 13,17% and 22,65%).

The residence area will only influence satisfaction with nurse's information, other professionals, waiting time, access, exchange of information and global perception of care ($p< ,005$). Those who live in an urban area are more satisfied (higher mean ranks) with access ($\bar{r}= 53,14$) and less satisfied with the exchange of information

($\bar{r} = 49,97$). Opposing that opinion, those who live in a rural area are more satisfied with the information ($\bar{r} = 37,72$) and less with the access.

Analysing the link between satisfaction and monthly income, there's only one result that's statistically significant ($p < ,05$): those who receive the equivalent to or more than two times the national minimum wage are more satisfied with the global perception of care ($\bar{r} = 50,80$) (Table 5).

Table 5 - U Mann-Whitney test between patient's satisfaction and residence area and between satisfaction and income.

Residence area	Rural	Urban	U Mann-Whitney test	
Satisfaction	\bar{r}	\bar{r}	UMW	p
Nurse				
Information	37,65	50,10	548,000	,022
Other Professionals	36,81	51,67	502,500	,006
Waiting time	36,76	51,76	500,000	,004
Access	36,02	53,14	460,000	,001
Exchange of information	37,72	49,97	552,000	,019
Global perception of care	37,39	50,59	534,000	,011
Income				
	Minimum Wage	$\geq 2 \times$ Minimum Wage	U Mann-Whitney test	
Satisfaction	\bar{r}	\bar{r}	UMW	p
Global perception of care	39,21	50,80	454,000	,046

To see how the patients' satisfaction differs from medics to nurses, we applied the student's t-test. Since the difference between means is -10,65 (Sd= 16.88), it's possible to state that satisfaction with nurses is, on average, higher. The value of t is explanatory ($t = -5,749$; $p = ,000$), so there are statistically significant differences between satisfaction with doctors and satisfaction with nurses.

There's a positive direct Pearson Correlation between satisfaction with medical care parameters and with nursing care parameters ($p = ,000$). It is stronger between total satisfaction with doctors and satisfaction with doctors technical abilities ($\bar{r} = ,952$) and weaker between nurses availability and doctors technical abilities. It is also positive the existent correlation between the significant parameters of care organization ($p = ,000$): stronger between waiting time and with access ($\bar{r} = ,937$) and weaker between satisfaction with waiting time and satisfaction with global perception of care ($\bar{r} = ,603$).

CONCLUSIONS

We conclude that most of the patients in palliative care are women, with 70,95 years (average), single, divorced or widowed, living in rural areas out of the district of Viseu, illiterate, professionally inactive, receiving the equivalent to the national minimum wage and religious. They have been hospitalized for less than two weeks in a ULS because of an oncological disease which begun before 2012. Patients also have history of other previous hospitalizations and other diseases. Most of them refer moderate symptomology, mainly pain and tiredness.

The satisfaction with the global perception of care had, what we consider to be, a positive score (on average, above 50%). Higher values were attributed to nurses and their interpersonal skills and lower values to doctor's availability and to the waiting time.

Of all the sociodemographic variables studied, only age, area of residency and monthly income will predict satisfaction: it will be higher when they are younger (regarding waiting time), living in urban areas (concerning satisfaction with nurses' information, other professionals, waiting time, access, exchange of information and global perception of care) and with an income equivalent to two times the minimum wage or higher (regarding global perception of care).

About the clinical variables studied, only the place where patients receive palliative care will influence satisfaction with doctors (information, availability and total satisfaction), nurses (interpersonal abilities, information, availability and total satisfaction), waiting time and access.

Concerning the relation between quality of sleep and satisfaction, we infer that there is a positive relation between subjective satisfaction with sleep and satisfaction with care. Contrarily, there's a negative relation between insomnia and satisfaction as with between the latter and overall satisfaction with sleep.

We suggest the development of more investigation in this area with bigger samples and including psychological and sociological variables such as family support; systematic monitoring of satisfaction and its determinants through a single instrument; use of this data to evaluate the quality of health; include palliative care formation in academic curriculums, also to raise awareness on the subject; higher rate of nurses per patient, improving availability; apply other measures that will improve access and waiting time, the items with the lowest score in our study.

Lastly, it is relevant to stress the importance of this type of investigations, since there have been progressively more individuals with terminal chronic disease and they deserve dignity and quality of care.

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References

- Alderman, J. (2013). *Palliative care + patient satisfaction*. University of Oklahoma. United States of America: HFM Magazine. Retrieved from <http://web.b.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=e416930b-341d-4636-a69e85af1f869724%40sessionmgr115&vid=2&hid=114>
- Costa, G. (2011). *Avaliação da satisfação dos utentes do hospital de dia de especialidades médicas do hospital de Egas Moniz* (Masters Degree, Universidade Nova de Lisboa). Retrieved from <http://run.unl.pt/handle/10362/9257>
- EIU. (2010). *The quality of death: Ranking end-of-life care*. Retrieved from <http://graphics.eiu.com/upload/eb/qualityofdeath.pdf>
- EORTC Quality of life Group. (2001). *EORTC IN – PATSAT32*. Retrieved from <http://www.eortc.be/qol/files/PATSAT/IN-PATSAT32%20Portuguese.pdf>
- Figueiredo, S. (2012). *Perturbações do sono e a qualidade de vida do utente hipertenso*. (Masters Degree, Escola Superior de Saúde de Viseu, Viseu). Retrieved from <http://repositorio.ipv.pt/bitstream/10400.19/1758/1/FIGUEIREDO%20Sandra%20Gon%C3%A7alves%20-%20Disserta%C3%A7%C3%A3o%20mestrado.pdf>
- Misko, M. (2012). *A experiência da família da criança/adolescente em cuidados paliativos: Flutuando entre a esperança e a desesperança em um mundo transformado pelas perdas* (Tese de mestrado, Universidade de São Paulo, Escola de Enfermagem do Ribeirão). Retrieved from <http://www.teses.usp.br/teses/disponiveis/83/83131/tde-23082012-131733/publico/Tese.pdf>
- Monteiro, D. (2009). *Escala de Edmonton e cuidados paliativos: Revisão integrativa*. (Licentiate Degree, Universidade Federal do Rio Grande do Sul). Retrieved from <http://www.lume.ufrgs.br/bitstream/handle/10183/24699/000748477.pdf?sequence=1>
- Nunes, R. (2014). *Ética em cuidados paliativos*. In M. Othero, & A. Costa (Eds.). *Reabilitação em cuidados paliativos* (pp. 37-52). Loures: Lusodidacta.
- Othero, M., & Costa, A. (2014). *Conceitos, princípios e formação em cuidados paliativos*. In M. Othero, & A. Costa (Eds.), *Reabilitação em cuidados paliativos* (pp. 23-35). Loures: Lusodidacta.
- Pereira, S. (2010). *Cuidados paliativos: Confrontar a morte*. Lisboa: Universidade Católica Editora.
- Ribeiro, A. (2012). *Controlo dos sintomas em cuidados paliativos num serviço de medicina interna* (Masters Degree, Universidade de Lisboa, Faculdade de Medicina). Retrieved from http://repositorio.ul.pt/bitstream/10451/8755/1/676369_Tese.pdf
- Santos, M., & Capelas, L. (2011). *Investigação em cuidados paliativos em Portugal*. *Cadernos de Saúde*, 4(1), pp. 63-69. Retrieved from http://www.cadernosdesaude.org/menu/docs/C_Saude_4.1_Investigacao.pdf
- Sousa, A. (2012). *Sintomas em cuidados paliativos: Da avaliação ao controlo* (Masters Degree, Universidade do Porto, Instituto de Ciências Biomédicas de Abel Salazar). Retrieved from http://sigarra.up.pt/icbas/pt/pubs_pesquisa.show_publ_file?pct_gdoc_id=8522

World Palliative Care Alliance & WHO. (2014). *Global atlas of palliative care at end of life*. Retrieved from http://www.who.int/nmh/Global_Atlas_of_Palliative_Care.pdf
WHO. (2015). *Palliative care*. Retrieved from <http://www.who.int/cancer/palliative/en/>

Determination Of Middle School Students' Misconceptions Related To The Unit Of "Structure And Properties Of Matter" Using A Two-Tier Diagnostic Test

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ABSTRACT

Studies on science education show that students have many misunderstandings and misconceptions related to chemistry concepts. Many techniques have been used to determine those misconceptions such as multiple choice tests, interviews, drawing, etc. Two-tier diagnostic test is one of these techniques for using to determine misconceptions and their reasons. For this reason, in this study, it was aimed to determine middle school students' misconceptions related to the unit of "Structure and Properties of Matter" using a Two-Tier Diagnostic Test. The study was conducted with two hundred twenty five 7th grade students, who had already learned the unit of "Structure and Properties of Matter" and studied at three different middle schools in İstanbul. In this study "Structure and Properties of Matter Achievement Test", which was developed by the researchers and ensured validity and reliability, was used to collect data. The test was a two-tier diagnostic test that consists 32 items. Reliability coefficient was found to be 0.90. According to the results, it was found that students had high level of misconceptions about the topics "Stable Atom, Ion, Anion, Cation, Ionic Bond, Covalent Bond, Compound, Homogenous and Heterogeneous Mixtures, Concentrated and Dilute Solutions".

INTRODUCTION

Today, learning takes place based on conceptual basis. This is why, it's very important that students learn concepts in a correct and effective way and make sense of them. The fact that learning basic concepts well, help students to learn further topics has been pointed out by researchers (Briggs and Holding, 1986; Griffiths and Preston, 1992). Although concept learning is important, a lot of problems are faced with in the teaching process. One of them is misconceptions (Alım, 2008, p.177). Misconceptions, can be defined as the information, derived as a result of personal experiences contrary to scientific facts that prevent teaching of scientifically proven facts (Chi and Roscoe, 2002; Koray et al. 2007). One of the most important issue in learning Science and Technology lesson has been regarded as students' misconceptions. In order to ensure meaningful and permanent learning, misconceptions should be identified and be remedied (Osborne and Freyberk, 1996; Baysarı, 2007). There are many studies addressing misconceptions in science in the literature. Research address that students have some misconceptions about the basic concepts of chemistry, such as "The Electron Array and Chemical Properties", "Chemical Compounds", "Bonds and formulas" and "Mixtures" (Abraham et. al., 1992, 1994; Akgün and Aydın, 2009; Barker, 2000; Bayrak, 2005; Coştu et. al., 2005; Çalık and Ayas, 2005; Dindar et. al., 2010; Goodwin, 2002; Kabapınar, 2001; Lee et. al. 1993; Nicoll, 2010; Ozmen, 2004; Papageorgiou and Sakka, 2000; Say, 2011; Stavy, 1990; Taber, 1998; Tezcan and Salmaz, 2005; Uzun, 2010; Uzunıtyaki and Geban, 2005; Urek and Tarhan, 2005; Valanides, 2000).

Different techniques have been used in order to determine students' misconceptions. Techniques often used are; concept maps (Ross and Munby, 1991), conversation (Osborne and Gilbert, 1980; Coll and Taylor, 2001; open-ended questions (Glazar and Vrtacnic, 1992) and multiple choice tests (Nakipoglu and Tekin, 2006; İnce, Acar Sesen and Kırbaşlar, 2012). While techniques used in determining the students' misconceptions, help to define what misconceptions students have, it is not possible to have an idea about the causes of these misconceptions. So, in order to define misconceptions, and their reasons, two-tier diagnostic tests have been used (Garnett and Treagust, 1992; Odom and Barrow, 1995; Tan, Goh, Chia and Treagust, 2002). The first section of two-tier tests includes information assumptions similar to multiple choice tests. Here, there is a question item called a root agent, or an information assumption with various number of choices that follow (Chen, Lin and Lin, 2002; Karataş, Köse and Coştu, 2003; Treagust and Haslam, 1986). The second section that differentiates two-stage tests from multiple choice tests, can be made up of open ended questions that require students to justify their reasons for marking the choices in the first section, or multiple choice options again (Tan and Treagust, 1999; Peterson et al., 1989). The second part of the research is prepared depending on, the literature study, the results from interviews and open-ended questions or already defined students misconceptions (Jang, 2003).

THE STUDY

In this study, it was aimed to determine middle school students' misconceptions related to the subjects of "The Electron Array and Chemical Properties", "Chemical Bonds", "Compounds and Formulas", "Mixtures" in the unit of "Structure and Properties of Matter" by using a Two-Tier Diagnostic Test. This study was conducted with two hundred twenty-five 7th grade students, who had already learned the unit of "Structure and Properties of Matter" and studied at three different middle schools in İstanbul in 2013-2014 academic year. As data collection tools, "Structure and Properties of Matter Achievement Test" which have been designed by the researcher and tested in terms of validity and reliability were used. The test was a two-tier diagnostic test that consists 32 items. Reliability coefficient was found to be 0.90. Lertap 5 was used to analyse students' misconceptions.

FINDINGS

Results of students' misconceptions related to "Electron Sequence and Chemical Properties" under the unit of "Structure and Properties of Matter Achievement Test" and their percentages and frequencies are given in Table 1.

Table 1: Students' misconceptions about "Electron Sequence and Chemical Properties " defined as a result of "Structure and Properties of Matter Achievement Test".

Concept	Misconceptions	f	%
Electron Sequence and Chemical Properties	Stable Atom		
	Stable atoms tend to give out electrons.	33	15
	Atoms containing only eight electrons in the last layer may participate in formation of links.	27	12
	Ion		
	When an electron is disconnected from any atom, anions are formed.	68	30
	When an electron is disconnected from any atom, an electron is disconnected, and loses its energy.	23	10
	Cation is formed when a neutral atom receives an electron.	27	12
	Atom Model		
	An neutral atom with 2 electrons in its last orbit, is expected to form a (-2) anion.	43	19
	For an atom, to be chemically determined, it has to have 2 electrons in its outmost energy level.	18	8
	Cation and Anion		
	In order to have noble gas structure, cations (+) by accepting electrons and anions by giving electrons are formed.	38	17
	Atoms become anion by accepting proton, and become cation by giving protons.	27	12
	Polyatomic ions are in form of cations.	25	11
	There is only one kind of atom in the structure of polyatomic ions.	25	11
	During bond-formation, all electrons of both atoms play the most active role.	32	14
	There is electron sharing in NaCl, and electron exchange in H ₂ O.	43	19

As shown in Table 1, it was detected that, students had misconceptions about "Stable atom" approximately 12-15%, about "Ion" in ratio of 10-30%, about "Atom Model" in ratio of 8-19%, about "Cation and Anion" concept approximately in ratio of 11-19%.

Table 2: Students' misconceptions about “Chemical Bonds” defined as a result of "Structure and Properties of Matter Achievement Test"

Concept	Misconception	f	%
Chemical Bonds	Ionic Bond		
	The bond that keeps Na and Cl atoms together is the metallic bond.	23	10
	A single Cl atom makes only ionic bond with a different atom.	32	14
	Salt (NaCl) and water (H ₂ O) both have Ionic structure.	29	13
	Covalent Bonds		
	Salt (NaCl) and water (H ₂ O), both have covalent structure.	50	22
	Covalent structures consist of electron exchange.	38	17
	In covalent structures, as anion and cation have opposite loads, they attract each other.	36	16
	When covalent bond is formed, the electrons in the last layer of the atoms change places.	25	11
	Covalent Bond Made up of Different Elements (HCl)		
	Made bond with the Cl atom of the H atom; It is ionic bonds.	56	25
	Made bond with the Cl atom of the H atom; It is metallic bond.	27	12
	HC l compound is formed with ionic bonds.	63	28

As shown in Table 2, it was detected that, students had misconceptions about "Ionic Bond" in ratio of 10-14%, about "Covalent Bond" in ratio of 11-22%. Approximately 12-28% of them had misconception about "Covalent Bond Made Up of Different Elements (HCl)" concept.

Table 3: Students' misconceptions about “Compounds and Formulas” defined as a result of "Structure and Properties of Matter Achievement Test".

Concept	Misconception	f	%
Compounds and Formulas	Compound		
	Compounds are divided into components physically.	27	12
	There is no specific ratio between the compounds and components.	23	10
	Water is solution.	68	30
	Water is mixture.	34	15
	The compound is formed as oxygen atoms make chemical bonds.	81	36
	Ionic and Molecular Compound		
	When atoms form the compound, they don't lose their features.	25	11
	Compound, is the smallest unit that different type of atoms form by means of ionic bond.	34	15
	Molecular structure compounds are formed only by common use of same type of atoms	54	24

As shown in Table 3, it was detected that, students, under the heading of "Compounds and Formulas", have misconceptions about "Compound" in ratio 10-36%, about "Ionic and Molecular Compound" concept approximately in ratio 11-24%.

Table 4: Students' misconceptions about "Mixtures" defined as a result of "Structure and Properties of Matter

Concept		Misconception	f	%
Mixtures	Mixture	Salt dissolves homogeneously both in water and oil.	23	10
		Materials that make up the heterogeneous mixture, dissolve evenly to each part of the mixture.	46	20
		Salty water is a heterogeneous mixture.	54	24
	Dissolution Event	Salt, melts in water.	23	10
		When we put edible salt to a glass of water, a new compound is formed as the salt ions are combined with water.	29	13
		When a little bit of sugar is added to water, the concrete sugar, becomes fluid.	65	29
		When sugar is added in water, sugar disappears.	43	19
	Dissolution Rate	Granulated sugar and sugar cubes dissolve at the same rate when put into two different container with water at the same temperature.	47	21
		Equal amounts of crushed sugar dissolves more than cube sugar.	29	13
	Dilute Concentrated Solution	Adding water to the solution is a process of increasing its concentration	41	18
	Conductivity Solution	When sugar is added in water, it dissolves to its ions.	32	14
		Pure water and sugar water transmit electricity.	23	10

Achievement Test".

As shown in Table 4, it was detected that, students, under the heading of "Mixtures", have misconceptions about "Mixture" in ratio 10-24 %, about "Dissolution Event" in ratio 10-29 %, about "Dissolution Rate" in ratio 13-21 %, about " Dilute Concentrated Solution " in ratio 14-18 %, about "Conductivity Solution" concept approximately in ratio 10%.

CONCLUSIONS

As a result of "Structure and Properties of Matter Achievement Test" applied within the scope of this study, it was detected that, students, among the concepts under the heading of "Electron Array and Chemical Properties" have the highest misconception with "When an electron is disconnected from any atom, anions are formed." It was also detected that students have misconceptions such as; "Stable atoms tend to give out electrons.", "Atoms containing only eight electrons in the last layer may participate in formation of bonds.", "When an electron is disconnected from any atom, an electron is disconnected, and loses its energy.", "Polyatomic ions are in form of cations." In this study, it was detected that students are confused about stable atom and neutral atom concepts in a way similar to the misconception about stable atom concept indicated by Uslu (2011); as "If the number of protons and electrons are equal, if there is no need for proton and electron, the atom is stable." Similar findings to misconceptions detected within the scope of the study as in, "Cation is formed when a neutral atom receives an electron.", "For an atom, to be chemically determined, it has to have 2 electrons in its outmost energy level.", "An neutral atom with 2 electrons in its last orbit, is expected to form a (-2) anion.", "In order to have noble gas structure, cations (+) by accepting electrons and anions by giving electrons are formed.", "Atoms become anion by accepting proton, and become cation by giving protons." have been indicated by other researchers as well. (Kara and Ergül, 2012; Uzun, 2010; Uzuntiryaki, 2003). The misconceptions detected as in "There is electron sharing in NaCl, and electron exchange in H₂O." coin with the results of Butts and Smith (1987). When misconceptions related to concepts under the heading of "Chemical bond" were studied, it was detected that, misconceptions of the students were at a high rate about concepts such as "Ionic Bond", "Covalent Bond", and "Covalent Bond Made Up of Different Elements (HCl)", and the highest rate of misconception was in "HCl compound is formed with ionic bond." Students' misconceptions as in, "A single Cl atom makes only ionic bond with a different atom" was detected by the researcher, within the scope of this study. Besides, the misconception as in "The bond that keeps Na and Cl atoms together is the metallic bond", "Salt (NaCl) and water (H₂O) both have Ionic structure." were detected by other researchers. (Nicoll, 2010; Taber, 1998). It was also indicated that; misconceptions that were detected in this study as in " Salt (NaCl) and water (H₂O), both have covalent structure", "Covalent structures consist of electron exchange", " In covalent structures, as anion and cation have opposite loads, they attract each other.", "When covalent bond is formed, the electrons in the last layer of the atoms change places.", " Made bond with the Cl atom of the H atom; It is ionic bonds.", " Made bond with the Cl atom of the H atom; It is metallic bond.", "During bond-formation, all electrons of both atoms play the

most active role" are similar to other studies (Nicoll, 2010; Taber, 1998; Urek and Tarhan, 2005; Altınyüzük, 2008; Uzun, 2010). Other misconceptions showing that students are confused about ionic and covalent bond such as; "Ionic bond is the bond among molecules.", "Covalent bond is common usage of electrons by different metals"(Butts and Smith, 1987; Altınyüzük, 2008), "Covalent bond is the strength of attraction between the negative and positive ends of atom"(Nicoll, 2010), "NaCl is a covalent bonded compound." (Butts and Smith, 1987), "Covalent bond, is formed as a result of electron exchange between two metals." (Urek and Tarhan, 2005), "There is intermolecular bond in ionic compounds." (Taber, 1998) have been detected in other researches as well. With regards to the concepts under the heading of "Compounds and Formulas"; a high misconception rate was detected about "Compound" and "Ionic and Molecular Compound" concepts. It was detected that the students had the highest rate with misconceptions such as; "The compound is formed as oxygen atoms make chemical bonds.", "Water is a solution." It was also detected that students had misconceptions such as; "Compounds are divided into components physically.", "There is no specific ratio between the compounds and components.", "Water is a mixture." The detected misconceptions correspond to the results of researches conducted by Uzun (2010), Konur and Ayas (2008), Uzuntiryaki and Geban (2005), and Meseci, Tekin and Karamustafaoglu (2013). Misconceptions such as; "When atoms form the compound, they don't lose their features.", "Compound, is the smallest unit that different type of atoms form by means of ionic bond.", "Molecular structure compounds are formed only by common use of same type of atoms" were indicated by Urek and Tarhan (2005), Novick and Nussbaum (1978) as well. It was detected that with regards to the concepts under the heading of "Mixtures"; students had high rate of misconceptions such as, "Mixture", "Dissolution Event", "Dissolution Rate", "Dilute Concentrated Solution" and "Conductivity Solution". It was found that the highest misconception students had was as "When a little bit of sugar is added to water, the concrete sugar, becomes fluid." Another misconception as; "Salt dissolves homogeneously both in water and oil" was also indicated within the scope of the study. The misconceptions such as "Materials that make up the heterogeneous mixture, dissolve evenly to each part of the mixture.", "Salty water is a heterogeneous mixture." parallel to the results of the research conducted by Kalın (2008), Kalın and Arıkıl (2010). The misconception that "Salt, melts in water ." also show similar results to the results of different researchers (Uzun, 2010; Akgun and Aydın, 2009; Kalın and Arıkıl, 2010; Valanides, 2000; Kabapınar, 2001; Kuşakci kim, 2007; Lee et.al. 1993; Say, 2011). The misconception that "When we put edible salt to a glass of water, a new compound is formed as the salt ions are combined with water." corresponds to the results of Coştu et al. (2005), Papageorgiou and Sakka (2000), Ebenezer and Fraser (2001), Kabapınar (2001). The misconception; "When sugar is added in water, sugar disappears" correspond to Uzun (2010), Akgün ve Aydın (2009), Uzuntiryaki and Geban (2005), Ebenezer and Erickson (1996), Abraham et. al. (1994), Lee et al. (1993). The misconception that "Granulated sugar and sugar cubes dissolve at the same rate when put into two different container with water at the same temperature" is similar to the misconception defined by Uzun that; "There is no relation between the grain size and dissolution." The misconception "Adding water to the solution is a process of increasing its concentration." is similar to Meşeci, Tekin and Karamustafaoglu's (2012) studies. The misconception detected among the students; "When sugar is added in water, it dissolves to its ions." is similar to the results of the study conducted by Sen and Yilmaz (2012). Also the misconception, "Pure water and sugar water transmit electricity." is similar to the results of the study conducted by Uzun (2010). In order to ensure meaningful and permanent learning, it is very important to realize learning process by defining the misconceptions of students. It is therefore, believed that, students' misconceptions found as a results of this study about subjects within "Structure and Properties of Matter" unit will be helpful to educationalists, in planning the educational program and implementing it.

References

- Abraham, M.R., Gryzybowski, E.B., Renner, J.W. and Marek, A.E. (1992). Understanding and misunderstanding of eighth graders of five chemistry concepts found in textbooks. *Journal of Research in Science Teaching*, 29: 105-120.
- Abraham, M.R., Williamson, V.M. & Westbrook, S.L. (1994). A cross-age study of the understanding five concepts. *Journal of Research in Science Teaching*, 31: 147-165.
- Akgün, A. & Aydın, M. (2009). "An application of Constructivist Learning Theory: using Collaborative Study Groups Strategy in eliminating the students' misconceptions on and decreasing the knowledge deficiencies in the concepts of Melting And Dissolving". *Electronic Journal of Social Sciences*, 8(27): 190-201.
- Alım, M. (2008). Öğrencilerin lise Coğrafya Programında yer alan Yer Yuvarlağı ve Harita Bilgisi ünitelerindeki bazı kavramları anlama düzeyleri ve kavram yanlışları. *Milli Eğitim Dergisi*, 177: 166-180.
- Altınyüzük, C. (2008). İlköğretim sekizinci sınıf öğrencilerinin fen bilgisi dersi kimya konularındaki kavram yanlışları. Yüksek Lisans Tezi, İnönü Üniversitesi Sosyal Bilimler Enstitüsü.

- Barker, V. (2000). Students' reasoning about basic Chemical Thermodynamics and Chemical Bonding: What changes occur during a context-based post-16 chemistry course? *International Journal of Science Education* 22: 1171–1200.
- Bayrak, H. (2005). *İlköğretim 8. sınıf öğrencilerinin Kimyasal Bağlar konusundaki başarılarına, öğrendikleri bilgilerin kalıcılığına, tutum ve algılamalarına Çoklu Zeka Kuramına Dayalı Öğretimin etkisi*. Yüksek Lisans Tezi. Gazi Üniversitesi Eğitim Bilimleri Enstitüsü.
- Baysarı, E. (2007). *İlköğretim Düzeyinde 5. Sınıf Fen Ve Teknoloji Dersi Canlılar Ve Hayat Ünitesi Öğretiminde Kavram Karikatürü Kullanımının Öğrenci Başarısına, Fen Tutumuna Ve Kavram Yanılgılarının Giderilmesine Olan Etkisi*. (Yüksek Lisans Tezi). Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü.
- Briggs, H. & Holding, B. (1986). *Aspects of secondary students' understanding of elementary ideas in chemistry. Research Report*, CLISP, University of Leeds, UK.
- Butts, B., & Smith, R. (1987). HSC chemistry students' understanding of the structure and properties of Molecular And Ionic Compounds. *Research in Science Education*, 17: 192–201.
- Chen, C. C., Lin, H. S. & Lin, M. L. (2002). Developing a two-tier diagnostic instrument to assess high school students' understanding-the formation of images by a plane mirror. *Proceedings of the National Science Council*, 12(3):106-121.
- Chi, M. & Roscoe, R. (2002). The processes and challenges of conceptual change. [Electronic version]. *Behavioral Science*. 2:3-27.
- Coll, R. K. & Taylor, T. (2001). Alternative conceptions of Chemical Bonding held by upper secondary and tertiary students. *Research in Science and Technological Education*, 19: 171–191.
- Coştu, B., Ayas, A., Çalık, M., Ünal, S. & Karataş, F. Ö. (2005). Fen öğretmen adaylarının çözelti hazırlama ve laboratuvar malzemelerinin kullanma yeterliliklerinin belirlenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi* 28: 65-72.
- Çalık, M. & Ayas, A. (2005). 7.-10. Sınıf öğrencilerinin seçilen Çözelti kavramlarıyla ilgili anlamalarının farklı karışımlar üzerinde incelenmesi. *Türk Eğitim Bilimleri Dergisi*, 3(3): 329-347.
- Dindar, A. Ö., Bektaş, O. & Çelik, A. Y. (2010). What are the pre-service chemistry teachers' explanations on chemistry topics?. *Educational Research Association The International Journal of Research in Teacher Education*, 32-41, ISSN: 1308-951X
- Ebenezer, J. V & Erickson. (1996). Chemistry students' conception of Solubility: *A Phenomenography*. *Science Education*, 80(2): 181-201.
- Ebenezer, J. V. & Fraser, M. D. (2001). First year chemical engineering students' conception of Energy in solution processes: *Phenomenographic Categories for Common Knowledge Construction*. *Science Education*, 85: 509-535. 2001.
- Garnett, P. J. & Treagust, D. F. (1992). Conceptual difficulties experienced by senior high school students of chemistry: electrochemical (galvanic) and electrolytic cells. *Journal of Research in Science Teaching*, 29(10):1079-1099.
- Glazar, S. A. & Vrtacnik, M. (1992). Misconception of Chemical Concepts, Kemija v soli, Slovene, *J. Chem. Educ.*, 5: 28–31.
- Goodwin, A. (2002). Is salt melting when it dissolves in water? *Journal of Chemical Education* 79(3):393-396
- Griffiths, A. K. & Preston, K. R. (1992). Grade-12 students' misconceptions relating to fundamental characteristics of atoms and molecules. *Journal of Research in Science Teaching*, 29: 611–628.
- İnce, E. , Acar Sesen B. & Kirbaslar, F.G.(2012).Investigation of undergraduate students' understanding of radiation and radioactivity, *Energy Educ. Sci. Technol. Part B*, 4(2): 993–1004.
- Jang, N. H. (2003). *Developing and validating a chemical bonding instrument for korean high school students. Dissertation*. University of Missouri: The Faculty Graduate School University
- Kabapınar, F. (2001). *Ortaöğretim öğrencilerinin çözünürlük kavramına ilişkin yanılgılarını besleyen düşünce birimleri*. Yeni Bin Yılın Başında Türkiye' de Fen Bilimleri Eğitimi Sempozyumu, Maltepe Üniversitesi, İstanbul.
- Kalın, B. (2008). *Üniversite öğrencilerinin Çözeltiler konusundaki kavram yanılgıları*. Yüksek Lisans Tezi. Balıkesir Üniversitesi Fen Bilimleri Enstitüsü. Balıkesir.
- Kalın, B., Arıkıl, G. (2010). Çözeltiler konusunda üniversite öğrencilerinin sahip olduğu kavram yanılgıları. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi (EFMED)*, 4 (2): 177-206.
- Kara, F.& Ergül, S. (2012). Fen bilgisi öğretmen adaylarının Çözünme ile ilgili temel kavramlar hakkındaki bilgilerinin incelenmesi. *Journal of Research in Education and Teaching*. 1 (2): 2146-9199.
- Karataş, F. Ö., Köse, S. & Coştu, B. (2003). Öğrenci yanılgılarını ve anlama düzeylerini belirlemede kullanılan iki aşamalı testler. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 13(1): 54-69.
- Konur, K. & Ayas, A. (2008). Sınıf öğretmeni adaylarının bazı kimya kavramlarını anlama seviyeleri. *Kastamonu Eğitim Dergisi*, 16(1): 83-90.

- Koray, Ö., Akyaz, N. & Köksal, M. S. (2007). Lise öğrencilerinin “Çözünürlük” konusunda günlük yaşamla ilgili olaylarda gözlenen kavram yanlışları. *Kastamonu Eğitim Dergisi*, 15 (1): 241-250.
- Kuşakçekim, F. (2007). *İlköğretim fen öğretiminde kavramsal karikatürlerin öğrencilerin kavram yanlışlarını gidermedeki etkisi*. Yüksek Lisans Tezi. Ankara Üniversitesi Eğitim Bilimleri Enstitüsü.
- Lee, O., Eichinger, D. C., Anderson, C. W., Berkheimer, G. D. & Blakeslee, T. D. (1993). Changing middle school students' conceptions of matter and molecules. *Journal of Research in Science Teaching*, 30:249-270.
- Meşeci, B., Tekin, S. & Karamustafaoğlu, S. (2013). Maddenin tanecikli yapısıyla ilgili kavram yanlışlarının tespiti. *Dicle Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 5(9): 20-40.
- Nakiboglu, C. & Tekin, B. B. (2006). Identifying students' misconceptions about nuclear chemistry: a study of Turkish high school students, *J. Chem. Educ.*, 83: 1712–1718.
- Nicoll, G. (2010). A report of undergraduates' Bonding misconceptions. *International Journal of Science Education*, 23(7): 707 -30.
- Novick, S. & Nussbaum, J. (1978). Junior high school pupils' understanding of the Particulate Nature of Matter. An interview study. *Science Education*, 62: 273-281.
- Odom, A. L. ve Barrow, H. L. (1995). Development and application of a two-tier diagnostic test measuring college biology students' understanding of diffusion and osmosis after a course of instruction, *Journal of Research in Science Teaching*, 32 (1): 45-61.
- Osborne, R. J., & Gilbert, J. K. (1980). A technique for exploring students' views of the world. *Physics Education*, 15(6): 376.
- Osborne & Freyberg, P. (1996). *Learning in Science the Implications of Children's Science*. Published by Heinemann Education.
- Özmen, H., Ayas, A. & Coştu, B. (2002). Fen bilgisi öğretmen adaylarının Maddenin Tanecikli Yapısı hakkındaki anlama seviyelerinin ve yanlışlarının belirlenmesi. *Kuram ve Uygulamada Eğitim Bilimleri*, 2(2): 507-529.
- Özmen, H. (2004). Fen öğretiminde öğrenme teorileri ve teknoloji destekli yapılandırmacı (constructivist) öğrenme. *The Turkish Online Journal of Educational Technology*, 3(1): 100-111.
- Papageorgiou, G. & Sakka, D. (2000). Primary school teachers' views on fundamental chemical concepts. *Chemistry Education*, 1(2): 237-247.
- Peterson, R. F., Treagust, D. F. & Garnett, P. (1989). Development and application of a diagnostic instrument to evaluate grade 11 and 12 students concepts of covalent bonding and structure following a course of instruction. *Journal of Research in Science Teaching*, 26(4): 301-314.
- Ross & Munby, H. (1991). Concept mapping and misconceptions: a study of high school students' understandings of acids and bases. *International Journal of Science Education*, 13:11-24.
- Say, F. S. (2011). *Kavram karikatürlerinin 7. sınıf öğrencilerinin Maddenin Yapısı ve Özellikleri” konusunu öğrenmelerine etkisi*. Yüksek Lisans Tezi. Karadeniz Teknik Üniversitesi Eğitim Bilimleri Enstitüsü. Trabzon.
- Stavy, R. (1990). Children's conception of changes in the state of matter: From liquid (or solid) to gas. *Journal of Research in Science Teaching*, 27: 247-266.
- Şen, Ş. & Yılmaz, A. (2012). Erime ve Çözünmeyle ilgili kavram yanlışlarının ontoloji temelinde incelenmesi. *Amasya Üniversitesi Eğitim Fakültesi Dergisi* 1 (1): 54-72.
- Taber, K. S. (1998). An alternative conceptual framework from chemistry education. *International Journal of Science Education*, 20 (5): 597-608.
- Tan K. C. D. & Treagust D. F. (1999). Evaluating students' understanding of chemical bonding. *School Science Review*, 81 (294): 75-83.
- Tan, K. C. D., Goh, K. N., Chia, S. L. & Treagust, D. F. (2002). Development and application of a two-tier multiple choice diagnostic instrument to assess high school students' understanding of inorganic chemistry qualitative analysis. *Journal of Research in Science Teaching*, 39(4): 283-301.
- Tezcan, H., Salmaz, Ç. (2005). Atomun yapısının kavratılmasında ve yanlış kavramaların giderilmesinde bütünleştirici ve geleneksel öğretim yöntemlerinin etkileri. *Gazi Üniversitesi Eğitim Fakültesi Dergisi*, 25(1): 41-54.
- Treagust, D. F. & Haslam, F. (1986). *Evaluating Secondary Students' Misconceptions of Photosynthesis and Respiration in Plants Using a Two-Tier Diagnostic Instrument*. National Association for Research in Science Teaching Kongesine sunulmuş bildiri.
- Uslu, S. (2011). *İlköğretim II. kademede fen ve teknoloji öğretiminde çalışma yapraklarının akademik başarı üzerine etkisinin incelenmesi*. Yüksek Lisans Tezi. Adıyaman Üniversitesi Fen Bilimleri Enstitüsü.
- Uzun, B. (2010). *Fen ve teknoloji öğretiminde kavramsal değişim stratejilerine dayalı olarak Maddenin Yapısı ve Özellikleri ünitesinin öğretimi*. Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü. İzmir.

- Uzuntiryaki, E. (2003). *Effectiveness of constructivist approach on students' understanding of Chemical Bonding concepts*. Doctor Of Philosophy. The Graduate School Of Natural And Applied Sciences. The Middle East Technical University. Ankara.
- Uzuntiryaki, E. & Geban, Ö. (2005). Effect of Conceptual Change Approach accompanied with concept mapping on understanding of Solution concepts *Instructional Science* , 33: 311–339.
- Ürek, R.Ö. & Tarhan, L. (2005). “Kovalent Bağlar” konusundaki kavram yanlışlarının giderilmesinde yapılandırmacılığa dayalı bir aktif öğrenme uygulaması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi* ,28: 168-177.
- Valanides, N.(2000). Primary student teachers' understanding of the Particulate Nature of Matter and its transformations during dissolving. *Chemistry Education*, 1(2): 249-262.

Determining The Pre-Service Teachers' Levels Of Awareness For Environmental Problems

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ABSTRACT

The aim of this study is to determine the levels of awareness of the pre-service science teachers for environmental problems. A total of 136 pre-service teachers, who are studying in the third and fourth grade of Department of Science Education, Faculty of Education, participated in this study. Data in the study was collected using the 44-item scale called "Awareness Scale for Environmental Problems" developed by Güven and Aydoğdu (2012). When the results of the study were evaluated, it was found that the Pre-Service Science Teachers' awareness for environmental problems showed a significant difference in favor of the fourth grade according to the class [$U = 693.000, p < .05$] and in favor of female students according to gender [$U = 1556.500, p < .001$].

Keywords: Science Education, Environmental Problems, Awareness, Pre-Service Teachers

INTRODUCTION

The excessive and poorly planned utilization of natural resources due to the rapid development of the industrial sector, the increasing human population, the growing material demands of society, and the continuous efforts to improve life standards has had the inevitable effect of altering the balance of nature and causing numerous environmental problems that threaten our entire world. The most significant of environmental problems our world faces today include the depletion of the ozone layer; deforestation; air, water and soil pollution; the excessive accumulation of solid wastes; noise pollution; pollution caused by transportation; the excessive use of chemical harmful to the environments; erosion; scarcity and hunger; the extinction of animal and plant species; global warming; and climate change (İleri, 1998; Kışlalıoğlu & Berkes, 2007).

The most important approach in tackling environmental problems is educating and increasing the level of awareness of all individuals within society about these issues (Bozkurt & Cansüngü, 2002). To ensure that individual understand environmental problems, and work on finding solutions for them, it is necessary to organize an effective environmental education programs (Aldrich & Benjamin, 1997). Environmental education is a continuous educational process that increases the awareness level of individuals regarding the environment; allows them to understand the concepts, values and attitudes concerning the environment; and allows them to gain the necessary knowledge, skill, values and experiences for solving environmental problems, such that they can leave a clean and healthier environment for future generations (Doğan, 1997; Vaughan et al., 2003). The raising individuals who are sensitive about environmental issues, who have solid knowledge and awareness regarding the environment, and who are willing to take part in activities pertaining to environmental problems, can only be achieved through the education provided by qualified teachers with strong environmental awareness. For this reason; it is of considerable importance to evaluate and determine teachers' and pre-service teachers' level of awareness and attitudes regarding the environment, since they assume a very important mission in the raising of future generations and in contributing to the creation of conscious and knowledgeable societies. In this context, the present study aimed to identify the level of awareness of pre-service science teachers regarding environmental problems.

METHODS

The study participants consisted of 136 third- and fourth-year students attending the Science Teaching Department of a university in northern Turkey. The study method was based on the screening model, which is a qualitative study method. The study data were obtained using the "Awareness on Environmental Problems Scale" developed by Güven and Aydoğdu (2012), which contains 44 items, and has a Cronbach's Alpha reliability coefficient of .90.

Data Analysis

Data were analyzed using the SPSS statistical package programs. The participating pre-service teachers' level of awareness on environmental problems was analyzed with respect to gender and class/year by using the Mann Whitney U test. Data obtained from the students' answers to the scale items were analyzed in terms of percentage (%) and frequency (f).

RESULTS

The results of the Mann Whitney U test used for evaluating the effect of gender on the pre-service science teachers' level of awareness regarding environmental problems are provided in Table 1.

Table 1. Mann Whitney U test results concerning the pre-service science teachers' level of awareness on environmental problems according to gender.

Gender	N	Mean rank	Rank Sum	U	p
Female	92	73.58	6769.50	1556.500	0.029
Male	44	57.88	2546.50		

According to Table 1, female students had a higher level of awareness regarding environmental problems [$U = 1556.500$, $p < 0.05$]. When the mean ranks were taken into consideration, it was determined that the female pre-service teachers had a better level of awareness regarding environmental problems than the male pre-service teachers.

The results of the Mann Whitney U test used for evaluating the effect of class/year on the pre-service science teachers' level of awareness regarding environmental problems are provided in Table 2.

Table 2. Mann Whitney U test results concerning the pre-service teachers' level of awareness on environmental problems according to gender.

Class/Year	N	Mean rank	Rank Sum	U	p
Third-Year	65	43.66	2838.00	693.000	0.000
Fourth-Year	71	91.24	6478.00		

According to Table 2, fourth-year students had a higher level of awareness regarding environmental problems [$U = 693.000$, $p < 0.001$]. When the mean ranks were taken into consideration, it was determined that the fourth-year pre-service teachers had a better level of awareness regarding environmental problems than the third-year pre-service teachers.

The results concerning the percentage (%) and frequency (f) distributions of the answers provided by the pre-service science teachers to the scale items are provided in Table 3.

Table 3. The percentage (%) and frequency (f) values of the answers provided by the pre-service science teachers to the scale items.

Items	Class/ Year	Yes		No Idea		No	
		f	%	f	%	f	%
1. Air pollution, the greenhouse effect, global warming, climate change and the depletion of the ozone layer are the causes of very significant global problems in the present-day world.	3	62	95.4	3	4.6	-	-
	4	71	100.0	-	-	-	-
2. Solving environmental problems passes through increasing environmental awareness and education.	3	62	95.4	3	4.6	-	-
	4	71	100.0	-	-	-	-
3. As noise is a relative concept, it cannot be considered as a form of pollution.	3	6	9.2	11	16.9	48	73.8
	4	5	7.0	1	1.4	65	91.5
4. Biomass energy, hydroelectric energy, water energy and wind energy represent renewable energy sources.	3	59	90.8	6	9.2	-	-
	4	68	95.8	3	4.2	-	-
5. Environmental problems have existed since the dawn of history, and the ecological balance has always found a natural solution for them by itself.	3	37	56.9	9	13.8	19	29.2
	4	22	31.0	7	9.9	42	59.2
6. Chemical wastes and substances are broken down by microorganisms before they can cause any water pollution.	3	16	24.6	6	9.2	43	66.2
	4	3	4.2	1	1.4	67	94.4
7. The efforts of a single country is not sufficient for addressing and preventing environmental problems; all countries across the world must exhibit joint efforts for preventing environmental problems.	3	65	100.0	-	-	-	-
	4	-	-	5	7.0	66	93.0
8. The most important causes of air pollution is the use of fossil fuels and the exhaust gases emitted by cars.	3	65	100.0	-	-	-	-
	4	71	100.0	-	-	-	-

9.	The greenhouse effect is caused by gases formed through the burning of fossil fuels, which increase the amount of heat from solar radiation that is trapped within the atmosphere.	3	65	100.0	-	-	-	-
		4	70	98.6	1	1.4	-	-
10.	Some of the environmental problems in the present-day world are caused by natural events, such as floods and volcanic eruptions.	3	45	69.2	20	30.8	-	-
		4	62	87.3	9	12.7	-	-
11.	Air, water and soil are renewable and inexhaustible resources.	3	16	24.6	14	21.5	35	53.8
		4	7	9.9	2	2.8	62	87.3
12.	Noise pollution can be prevented through forestation and the increased use of mufflers and mass transportation.	3	49	75.4	16	24.6	-	-
		4	69	97.2	2	2.8	-	-
13.	Reducing CO ₂ emissions will have significant effect in preventing the greenhouse effect and global warming	3	44	67.7	21	32.3	-	-
		4	68	95.8	3	4.2	-	-
14.	Increasing the use of natural gas and mass transportation will significantly reduce air pollution.	3	65	100.0	-	-	-	-
		4	70	98.6	1	1.4	-	-
15.	Owing to their extraordinary ability to adapt, human will eventually be able to adapt and live in polluted environments.	3	20	30.8	16	24.6	29	44.6
		4	10	14.1	3	4.2	58	81.7
16.	One of the environmental problems encountered in large cities in noise pollution, which is the cause of many of problems in urban settings.	3	65	100.0	-	-	-	-
		4	68	95.8	3	4.2	-	-
17.	To prevent acid rains, fossil fuels containing basic substances should be used instead.	3	39	60.0	26	40.0	-	-
		4	40	56.3	31	43.7	-	-
18.	Solid wastes are broken down by soil microorganisms; they consequently do not lead to any pollution.	3	9	13.8	2	3.1	54	83.1
		4	2	2.8	2	2.8	67	94.4
19.	The most important measures for the prevention of water pollution is the establishment of more waste water treatment facilities and the proper elimination of wastes.	3	65	100.0	-	-	-	-
		4	70	98.6	1	1.4	-	-
20.	One of the causes of the depletion of the ozone layer is the photochemical reactions of ozone triggered by solar radiation.	3	53	81.5	12	18.5	-	-
		4	45	63.4	26	36.6	-	-
21.	Nuclear weapons and reactors are the cause of radioactive radiation.	3	62	95.4	3	4.6	-	-
		4	71	100.0	-	-	-	-
22.	Global environmental problems is the main cause of the extinction of species across the world.	3	46	70.8	19	29.2	-	-
		4	67	94.4	4	5.6	-	-
23.	Sustainable development involves the transfer of existing resources to future generations.	3	65	100.0	-	-	-	-
		4	63	88.7	8	11.3	-	-
24.	Desertification, soil pollution and one-sided agricultural activities are prime causes of food scarcity in the present-day world.	3	59	90.8	6	9.2	-	-
		4	69	97.2	2	2.8	-	-
25.	Environmental impact assessment is an effective method for preventing environmental problems.	3	55	84.6	10	15.4	-	-
		4	63	88.7	8	11.3	-	-
26.	Indifference, negative attitudes and lack of education are important causes of environmental problems.	3	62	95.4	3	4.6	-	-
		4	71	100.0	-	-	-	-
27.	Environmental problems are issues of a global and cross-boundary nature.	3	53	81.5	9	13.8	3	4.6
		4	69	97.2	2	2.8	-	-
28.	Chlorofluorocarbon gases are the main cause of the depletion of the ozone layer.	3	65	100.0	-	-	-	-
		4	65	91.5	6	8.5	-	-
29.	Owing to their natural characteristics, centers of tourism do not	3	-	-	9	13.8	56	86.2

experience any significant environmental pollution.	4	4	5.6	1	1.4	66	93.0
30. Global warming will provide a solution for humanity's heating-related requirements; global warming is hence a positive development for humanity.	3	18	27.7	13	20.0	34	52.3
	4	5	7.0	3	4.2	63	88.7
31. Water pollution leads to dramatic changes in flora and fauna, while also causing eutrophication and a decrease in species biodiversity.	3	42	64.6	23	35.4	-	-
	4	69	97.2	2	2.8	-	-
32. Light pollution impedes astronomy research by causing an artificial brightness in the sky.	3	44	67.7	21	32.3	-	-
	4	51	71.8	20	28.2	-	-
33. There is no cause-and-effect relationship between desertification and global warming.	3	15	23.1	7	10.8	43	66.2
	4	1	1.4	3	4.2	67	94.4
34. Acid rains are only observed in inhabited areas with a high density of industrial facilities and organizations.	3	19	29.2	10	15.4	36	55.4
	4	18	25.4	7	9.9	46	64.8
35. Recycling refers to the processing of certain products for reuse and reutilization.	3	30	46.2	35	53.8	-	-
	4	46	64.8	25	35.2	-	-
36. Choosing and using agricultural practices suitable for the type of soil, and constructing set against the natural inclination of the terrain are effective means for combating soil erosion.	3	53	81.5	12	18.5	-	-
	4	71	100.0	-	-	-	-
37. Present-day environmental problems are the products of developments in the 20 th and 21 st centuries.	3	62	95.4	3	4.6	-	-
	4	66	93.0	5	7.0	-	-
38. Environmental problems require that individuals change their life-style and consumption habits.	3	6	9.2	9	13.8	50	76.9
	4	-	-	3	4.2	68	95.8
39. Illuminate large cities and high skyscrapers with copious amounts of light is the indication of a developed society.	3	16	24.6	18	27.7	31	47.7
	4	7	9.9	9	12.7	55	77.5
40. The greenhouse effect is a natural process necessary for maintaining the earth's temperature and ensuring the continuation of life on earth.	3	50	76.9	15	23.1	-	-
	4	67	94.4	4	5.6	-	-
41. Radioactive pollution is caused by radiation emitted by radioactive elements in nature	3	50	76.9	10	15.4	5	7.7
	4	22	31.0	6	8.5	43	60.6
42. Global warming, the greenhouse effect, climate change and the depletion of the ozone layer are all natural events occurring independently from environmental pollution, and as part of the earth's natural geological cycle.	3	24	36.9	10	15.4	31	47.7
	4	10	14.1	1	1.4	60	84.5
43. The depletion of the ozone layer differs between the northern and southern hemispheres, and also between equatorial and polar regions.	3	49	75.4	16	24.6	-	-
	4	58	81.7	13	18.3	-	-
44. Only countries which experience environmental problems are responsible for preventing and addressing them.	3	22	33.8	12	18.5	31	47.7
	4	11	15.5	1	1.4	59	83.1

According to Table 3; all or most of the pre-service science teachers expressed that air pollution, the greenhouse effect, global warming, climate change and ozone layer depletion are very significant global problems (95.4%, 100.0%), and that the most important causes of air pollution is the use of fossil fuels and the exhaust gases emitted by cars (100.0%, 100.0%). Most of the pre-service teachers also expressed that increasing the use of natural gas and mass transportation will help in significantly reducing air pollution (100.0%, 98.6%); that the greenhouse effect is caused by gases formed through the burning of fossil fuels, which increase the amount of heat from solar radiation that is trapped within the atmosphere (100.0%, 98.6%); and that reducing CO₂ emissions will have significant effect in preventing both the greenhouse effect and global warming (67.7%, 95.8%). The majority of the pre-service teachers similarly expressed that the greenhouse effect is a natural process necessary for maintaining the earth's temperature and ensuring the continuation of life on earth (76.9%, 94.4%); that global warming is not a solution for humanity's heating-related requirements, and that it is not, in this respect, a positive development for humanity (52.3%, 88.7%); and that there is a cause-and-effect

relationship between desertification and global warming (66.2%, 94.4%). Most pre-service teachers also described that chlorofluorocarbon (CFC) gases are the main cause of the depletion of the ozone layer (%100.0, %91.5); that one of the causes of the depletion of the ozone layer is the photochemical reactions of ozone triggered by solar radiation (81.5%, 63.4%); and that the depletion of the ozone layer differs between the northern and southern hemispheres, and also between equatorial and polar regions (75.4%, 81.7%). The majority of pre-service teachers also thought that fossil fuels containing basic substances should be used to prevent acid rains (60.0%, 56.3%); and that acid rains are not solely observed in inhabited areas with a high density of industrial facilities and organizations (55.4%, 64.8%). Furthermore, many of the pre-service teachers expressed that global warming, the greenhouse effect, climate change and the depletion of the ozone layer are not natural events occurring independently from environmental pollution, and that they are not part of the earth's natural geological cycle (47.7%, 84.5%).

The pre-service science teachers also described that noise is not a relative concept, and it can hence be considered as a form of pollution (73.8%, 91.5%); that noise pollution can be prevented through forestation and the increased use of mufflers and mass transportation (75.4%, 97.2%); and that noise pollution is one of the environmental problems encountered in large cities, and that it is the cause of many other problems in urban settings (100.0%, 95.8%).

Most pre-service science teachers also expressed that biomass energy, hydroelectric energy, water energy and wind energy are renewable energy sources (90.8%, 95.8%); that air, water and soil are not renewable and inexhaustible resources (53.8%, 87.3%); and that nuclear weapons and reactors are the cause of radioactive radiation (95.4%, 100.0%). It was also determined that most third-year pre-service teachers considered radioactive pollution as being mainly caused by radiation emitted from radioactive elements in nature (76.9%), while most fourth-year pre-service teachers expressed the opposite view (60.6%).

The pre-service science teachers mainly described that chemical wastes and substances are broken down by microorganisms before they can cause any water pollution (66.2%, 94.4%); that solid wastes are not broken down by soil microorganisms, and they consequently lead to pollution (83.1%, 94.4%); and that the most important measures for the prevention of water pollution is the establishment of more waste water treatment facilities and the proper elimination of wastes (100.0%, 98.6%). Furthermore, many of the third-year pre-service teachers did not know that the term "recycling" refers to the processing of certain products for reuse and reutilization (53.8%), while most of the fourth-year pre-service teachers knew the meaning of recycling (64.8%). In addition, the majority of the teacher expressed knew that sustainable development involves the transfer of existing resources to future generations (100.0%, 88.7%).

Most pre-service science teachers also expressed that some of the present-day environmental problems in the world are caused by natural events, such as earthquakes floods and volcanic eruptions (69.2%, 87.3%); that desertification, soil pollution and one-sided agricultural activities are the prime causes of food scarcity in the present-day world (90.8%, 97.2%); that water pollution leads to dramatic changes in flora and fauna, while also causing eutrophication and a decrease in species biodiversity (64.6%, 97.2%); light pollution impedes astronomy research by causing an artificial brightness in the sky (67.7%, 71.8%); and that illuminating large cities and high skyscrapers with copious amounts of light is not an indication of a developed society (47.7%, 77.5%).

It was also observed that many pre-service science teachers considered that owing to their extraordinary ability to adapt, humans will eventually be able to adapt and live in polluted environments (44.6%, 81.7%); that global environmental problems cause the extinction of species (70.8%, 94.4%); that present-day environmental problems are the products of developments in the 20th and 21st centuries (95.4%, 93.0%); that environmental problems require that individual change their life-style and consumption habits (76.9%, 95.8%); and that environmental impact assessment is an effective method for preventing environmental problems (84.6%, 88.7%). In addition, many pre-service teachers expressed that choosing and using agricultural practices suitable for the type of soil and constructing set against the natural inclination of the terrain are effective means for combating soil erosion (81.5%, 100.0%), while disagreeing with the thought that owing to their natural characteristics, centers of tourism do not experience any significant environmental pollution (86.2%, 93.0%). It was observed that while most third-year pre-service teachers believed that environmental problems have existed since the dawn of history, and that the ecological balance has always found a natural solution for them (56.9%); most fourth-year pre-service teachers held the opposing view (59.2%).

Many of the pre-service teachers considered that solving environmental problems passes through increasing environmental awareness and education (95.4%, 100.0%); that indifference, negative attitudes and lack of education represent important causes of environmental problem (95.4%, 100.0%); that the responsibility for preventing and addressing environmental problems does not solely befall onto the countries in which environmental problem exist (47.7%, 83.1%); and that environmental problems are issues of a global and cross-boundary nature (81.5%, 97.2%). In addition, while most third-year pre-service teachers expressed that the efforts of single countries is not sufficient for addressing and preventing environmental problems, and that all countries across the world must exhibit joint efforts for preventing environmental problems (100.0%); most fourth-year pre-service teachers expressed the opposing view (93.0%).

CONCLUSION

In this study, it was determined that, with respect to gender, female pre-service teachers showed a significantly higher level of awareness regarding environmental problems [$U = 1556.500$, $p < 0.001$], while, with respect to class/year, fourth-year pre-service teachers significantly showed significantly higher levels of awareness regarding environmental problems [$U = 693.000$, $p < 0.05$]. We believe that this difference was mainly due to the “Chemical Wastes and Environmental Pollution” course that fourth-year pre-service teachers attended during their fourth academic year’s spring semester, which covers in detail the subject of environmental pollution. Based on the study results, we determined that pre-service science teachers were generally aware of the different types of environmental problems, the dynamics which lead to environmental problems, and the issues and negative developments stemming from environmental problems. In addition, we also determined that the pre-service teachers were generally aware that environmental problems represent global issues; that environmental education is important for raising individuals’ knowledge and level of awareness concerning environmental problems; and that sustainable growth is very important for future generations.

Since humans represent the prime causative factor of environmental problems, the most important measure for their prevention is to increase individuals’ level of knowledge and awareness regarding the environment. Therefore; increasing individuals’ level of knowledge and awareness regarding the environmental and current environmental problems, ensuring that they become more sensitive towards environment-related subjects, and encouraging them to change their behaviors and attitudes that contribute to environmental pollution all represent essential prerequisites for effectively addressing and solving environmental problems. These prerequisites can only be achieved through an effective environmental education. Teachers have an important influence on the knowledge and attitudes of individuals, and hence assume a very important mission within society in this respect. Consequently, ensuring that pre-service teachers are sufficiently knowledgeable about the environment is vital for the raising of future generations who are environmentally-aware. For this reason; it is both necessary and important to include environment-related courses into the university curricula of pre-service teachers, and to further increase the environmental knowledge and awareness of these candidates through various educational activities.

References

- Aldrich, M. & Benjamin, C. (1997). *Environmental education*. London: The IEA Education and Training Unit and the IEA Environment Unit.
- Bozkurt, O. & Cansüngü, Ö. (2002). İlköğretim öğrencilerinin çevre eğitiminde sera etkisi ile ilgili kavram yanılgıları. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 23, 67-73.
- Doğan, M. (1997). *Türkiye ulusal çevre stratejisi ve eylem planı eğitim ve katılım grubu raporu*. Ankara: DPT Müsteşarlığı ve Türkiye Çevre Vakfı.
- Güven, E. & Aydoğdu, M. (2012). Çevre sorunlarına yönelik farkındalık ölçeğinin geliştirilmesi ve öğretmen adaylarının farkındalık düzeylerinin belirlenmesi. *Journal of Teacher Education and Educators*, 1(2), 185-202.
- İleri, R. (1998). Çevre eğitimi ve katılımın sağlanması. *Ekoloji Çevre Dergisi*, 7(28), 3-9.
- Kışlalıoğlu, M. & Berkes, F. (2007). *Çevre ve ekolojisi*. Ankara: Remzi Kitabevi.
- Vaughan, C., Gack, J., Solorazano, H. & Ray, R. (2003). The effect of environmental education on school children, their parents, and community members: a study of intergenerational and intercommunity learning. *The Journal of Environmental Education*, 34(3), 12-21.

Determining The Science Students' Attitudes For Solid Waste And Recycling

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ABSTRACT

The aim of this study is to determine the science students' attitudes for solid waste and recycling. A total of 264 science students, who are studying in the first, second, third and fourth grade of Department of Science Education, Faculty of Education, participated in this study. Data in the study was collected using the 33-item scale called "Attitudes Scale for Solid Waste and Recycling" developed by Karatekin (2013). When the results of the study were evaluated, a significant difference was observed in students' attitudes towards the recycling of solid waste in Kruskal Wallis test results [$X^2 = 51,337$, $p < .05$] according to grade level. This difference by which class was caused was determined by Mann-Whitney U test. According to these results, it was found that the fourth grade students' attitudes towards the recycling of solid waste were statistically more significant ($p < .05$) than the first ($p = .000$), second ($p = .000$) and third ($p = .000$) grade students' attitudes.

Keyword: Science Education, Solid Waste, Recycling, Attitudes

INTRODUCTION

The rapid increase in population and living standards around the world has led to a parallel increase in the consumption of natural resources to meet the growing human demand. This rapid rise in the consumption of natural resources has adversely affected the natural balance, contributing to environmental problems that threaten our world and human beings. One of the important environmental problems of our day is the accumulation of solid wastes. In Turkey, both the quantity and variety of solid wastes being produced in populated settlements and urban areas have increased significantly in recent years. Failure to properly dispose and utilize these solid wastes will inevitably lead to serious environmental problems that will adversely affect human health, the environment, and the economy. For this reason, the proper collection, recycling, and utilization of solid wastes is essential for ensuring sustainability.

"Solid wastes" are wastes generated by social, domestic, and industrial activities that can remain in nature for long periods of time without decomposing, thus causing pollution and negatively affecting human health (Kayranlı, Tankut & Pampal, 2003). To prevent the depletion of natural resources, many countries are increasingly focusing on the recycling and reutilization of wastes (Kocataş, 2012). Today, recycling and reutilization are the most important methods for reducing the generation of wastes and decreasing the consumption of natural resources (Meriç & Kayranlı, 2003). Promoting recycling efforts will have the effect of reducing pollution, as well as the demand for raw materials and energy (Kışlalıoğlu & Berkes, 2010), which, in turn, will have a positive impact on the environment, human health, and the economy (Spiegelman & Sheehan, 2004).

To be able to solve environmental problems effectively, it is first necessary to increase the awareness of the general population on the environment. Education is the main instrument through which people can gain knowledge and awareness about the environment, as well as the necessary attitudes for solving environmental problems. Today, environmental education aims to raise individuals who are knowledgeable and aware of environmental issues, and who possess the necessary interest and skills for addressing them (Peyton et al., 1995).

Since attitudes and habits take shape during the early years of life (Pettus, 1974; as cited by Kesicioğlu, 2009), it is important to ensure that children acquire the necessary awareness and sensitivity towards the environment at an early age, so that they can develop positive attitudes towards the environment. Such positive attitudes can be instilled through effective environmental education, which requires instructors of all levels who similarly possess positive attitudes towards the environment and about solving environmental problems. In this context, the aim of our study was to identify the attitudes of students (teacher candidates) receiving education at the Department of

Elementary School Science Education about the recycling of solid wastes; to thereby determine any deficiencies and shortcomings in their level of knowledge about this subject; and to propose recommendations on how their lack of knowledge can be resolved.

METHODS

The study was performed with a total of 264 first-year (N= 67), second-year (N=63), third-year (N=66), and fourth-year (N=68) university students enrolled in the Department of Elementary School Science Education at a university in northern Turkey. The study was performed using a screening study model, and by administering the “Attitude Scale on the Recycling of Solid Wastes,” a 33-item scale previously developed by Karatekin (2013). The scale consists of three factors. The 14-item “Initiative and Participation” factor has a Cronbach’s Alpha reliability coefficient of 0.892, while the eight-item “Belief” factor has a Cronbach’s Alpha reliability coefficient of 0.882, and the 11-item “Interest and Awareness” factor has a Cronbach’s Alpha reliability coefficient of 0.877. The answers provided by the students for the scale items were ranked as strongly agree, agree, neutral, disagree and strongly disagree.

Data Analysis

The attitude scores of the science education students were analyzed according to their year by using the Kruskal Wallis test, while the differences in the science education students’ attitude scores with respect to their year were analyzed by using the Mann-Whitney U-test. Data concerning the students’ responses to the scale items were analyzed in percentages (%).

RESULTS

The results of the Kruskal-Wallis test, performed in order to determine the attitude scores of the science education students according to their year, are provided in Table 1.

Table 1. Kruskal-Wallis test results concerning the attitude scores of the science education students with respect to their year.

Grade	N	Mean Rank	Sd	X ²	p
1	67	104.69	3	51,337	.000
2	63	108.28			
3	66	126.85			
4	68	187.82			

Table 1 indicates that the student attitudes regarding the recycling of solid wastes varied significantly depending on the students’ year [$X^2 = 51.337$ $p < 0.05$]. The Mann-Whitney U-test was performed to determine the specific years that were responsible for this significant difference. The results of the Mann-Whitney U-test are provided in Table 2.

Table 2. Mann-Whitney U-test results concerning the differences between the attitude scores of the science education students with respect to their year.

Grade	1	2	3	4
1	-			
2	2004.500 (p =.621)	-		
3	1889.600 (p =.148)	1793.000 (p =.178)	-	
4	842.500 (p =.000)	796.000 (p =.000)	1263.500 (p =.000)	-

Table 2 indicates that the attitude scores of fourth year students regarding the recycling of solid wastes were significantly higher compared to the attitude scores of first- (p=0.000), second- (p=0.000) and third-year students (p=0.000).

Table 3 shows the percentage (%) distribution of the science education students’ responses to the 14 items in the study scale’s “Initiative and Participation” factor.

Table 3. The percentage (%) distribution of the students' responses to the items in the "Initiative and Participation" factor.

Factor's Name	Item No	Item	Grade	A	B	C	D	E
				%	%	%	%	%
Initiative and Participation	3	I take initiative to solve problems relating to solid wastes.	1	9.0	50.7	25.4	11.9	3.0
			2	3.2	0	54.0	34.9	7.9
			3	9.1	57.6	16.7	13.6	3.0
			4	25.0	57.4	11.8	4.4	1.5
	11	I warn people who use paper wastefully.	1	11.9	44.8	25.4	17.9	0
			2	6.3	50.8	33.3	6.3	3.2
			3	22.7	39.4	22.7	13.6	1.5
			4	22.1	60.3	8.8	4.4	4.4
	16	I believe that it is difficult to separate and sort solid wastes at home.	1	0	32.8	14.9	40.3	11.9
			2	11.1	28.6	17.5	36.5	6.3
			3	6.1	19.7	25.8	33.3	15.2
			4	1.5	11.8	5.9	52.9	27.9
	18	I always prepare a shopping list before I go shopping.	1	20.9	52.2	11.9	13.4	1.5
			2	22.2	42.9	7.9	20.6	6.3
			3	16.7	48.5	1.5	28.8	4.5
			4	45.6	38.2	5.9	7.4	2.9
	19	I warn people who do not throw their recyclable wastes into recycling containers.	1	1.5	46.3	32.8	16.4	3.0
			2	4.8	39.7	36.5	14.3	4.8
			3	13.6	47.0	27.3	10.6	1.5
			4	30.9	47.1	13.2	7.4	1.5
	20	At home, I do not sort wastes for recycling.	1	3.0	26.9	19.4	47.8	3.0
			2	3.2	23.8	28.6	38.1	6.3
			3	0	16.7	16.7	48.5	18.2
			4	1.5	11.8	5.9	45.6	35.3
	21	I try to convince my family about the necessity of recycling wastes produced at home.	1	1.5	43.3	35.8	16.4	3.0
			2	7.9	41.3	36.5	12.7	1.6
			3	13.6	48.5	21.2	13.6	3.0
			4	23.5	51.5	11.8	13.2	0
	22	I encourage my friends to contribute to recycling efforts.	1	3.0	68.7	13.4	10.4	4.5
			2	6.3	47.6	31.7	12.7	1.6
			3	16.7	56.1	10.6	13.6	3.0
			4	30.9	58.8	5.9	0	4.4
	24	In case there are no recycling containers in my street, I notify the relevant authorities.	1	1.5	20.9	38.8	28.4	10.4
			2	4.8	27.0	41.3	27.0	0
			3	10.6	33.3	36.4	13.6	6.1
			4	13.2	39.7	32.4	5.9	8.8
	26	I would like to participate in awareness-raising activities on recycling.	1	25.4	34.3	29.9	10.4	0
			2	15.9	49.2	28.6	6.3	0
			3	21.2	59.1	19.7	0	0
			4	42.6	47.1	8.8	0	1.5
	27	I voluntarily participate in the solid waste collection activities of non-governmental organizations.	1	11.9	32.8	31.3	23.9	0
			2	12.7	33.3	31.7	19.0	3.2
			3	21.2	33.3	28.8	13.6	3.0
			4	33.8	35.3	13.2	8.8	8.8
	29	I voluntarily participate in environmental cleanup activities.	1	9.0	47.8	26.9	16.4	0
			2	15.9	38.1	31.7	14.3	0
			3	21.2	45.5	7.6	22.7	3.0
			4	33.8	36.8	17.6	8.8	2.9
	30	I avoid buying over packaged products.	1	4.5	23.9	47.8	22.4	1.5
			2	6.3	20.6	38.1	28.6	6.3
			3	12.1	45.5	18.2	22.7	1.5
			4	25.0	42.6	20.6	10.3	1.5
	33	I believe it is important to be informed about	1	7.5	73.1	16.4	3.0	0

		legal regulations on solid wastes and recycling.	2	17.5	65.1	12.7	3.2	1.6
			3	25.8	43.9	15.2	15.2	0
			4	54.4	42.6	2.9	0	0

A: Strongly Agree. B: Agree. C: Neutral. D: Disagree. E: Strongly Disagree

Table 3 indicates that the majority of first, second, third, and fourth year students at the Department of Elementary School Science Education have positive attitudes about warning people who use paper wastefully; convincing their family about the necessity of recycling; encouraging their friends to contribute to recycling efforts; participate in awareness-raising activities about recycling; participate voluntarily in environmental cleanup activities; and being informed about the legal regulations on solid wastes and recycling. These positive attitudes were observed more distinctly especially among fourth year students.

It was determined that 54.0% of second year students were indecisive about taking initiative to solve solid waste-related problems, while the large majority of first, third, and fourth year students had a positive attitude about taking initiative for solving these problems. In all years, there were students who were indecisive about notifying the relevant authorities in case there were no recycling containers on their street. In addition, the ratio of students with negative attitudes about notifying the authorities in such cases was higher among first year students (28.4%), while the ratio of students with positive attitudes about notifying the authorities was higher among third and fourth year students.

The ratio of students who were indecisive about participating in the solid waste collection activities of non-governmental organizations was higher among first and second year students compared to the other years (31.3% and 31.7%, respectively). Nevertheless, the ratio of students with positive attitudes about participating in such activities was generally high in all years, being the highest among fourth year students.

Some of the first and second year students were indecisive about avoiding buying more packaged products than they actually need (47.8% and 38.1%, respectively), while most third and fourth year students had positive attitudes about avoiding buying more packaged products than necessary.

Most students in all years—and especially fourth year students—disagreed with the statements “I believe that it is difficult to separate and sort solid wastes at home,” and “At home, I do not sort wastes for recycling,” thus expressing positive attitudes concerning the sorting of wastes at home.

Table 4 shows the percentage (%) distribution of the science education students’ responses to the eight-item “Beliefs” factor of the scale.

Table 4. The percentage (%) distribution of the students' responses to the items in the "Beliefs" factor.

Factor's Name	Item No	Items	Grade	A	B	C	D	E
				%	%	%	%	%
Beliefs	1	In the present-day world, reducing the amount of solid wastes is not really possible.	1	14.9	44.8	22.4	17.9	0
			2	12.7	60.3	15.9	11.1	0
			3	47.0	37.9	12.1	1.5	1.5
			4	64.7	0	29.4	1.5	4.4
	5	I do not believe that the recycling of solid wastes will contribute to the country's economy.	1	0	6.0	14.9	22.4	56.7
			2	6.3	3.2	0	47.6	42.9
			3	1.5	7.6	3.0	21.2	66.7
			4	4.4	0	22.1	73.5	0
	7	I am concerned by the possibility that future generations might not be able to use natural resources due to their depletion.	1	22.4	52.2	14.9	3.0	7.5
			2	34.9	52.4	7.9	4.8	0
			3	12.1	65.2	13.6	4.5	4.5
			4	44.1	42.6	5.9	1.5	5.9
	10	I believe that effective recycling practices can only be ensured through legal regulations.	1	10.4	25.4	34.3	20.9	9.0
			2	14.3	36.5	27.0	19.0	3.2
			3	13.6	27.3	30.3	16.7	12.1
			4	16.2	29.4	16.2	27.9	10.3
	12	I would support investments for recycling even if they entailed higher taxes.	1	16.4	50.7	23.9	9.0	0
			2	14.3	65.1	20.6	0	0
			3	21.2	60.6	12.1	0	6.1
			4	33.8	47.1	8.8	8.8	1.5
	13	The recycling of solid wastes will reduce the pressures on natural resources.	1	46.3	50.7	1.5	0	1.5
			2	25.4	63.5	11.1	0	0
			3	27.3	62.1	4.5	6.1	0
			4	61.8	32.4	4.4	0	1.5
	15	I believe that products obtained through recycling (i.e. recycled products) have negative effects on human health.	1	9.0	29.9	40.3	16.4	9.0
			2	3.2	11.1	19.0	54.0	12.7
			3	3.0	12.1	12.1	42.4	30.3
			4	8.8	11.8	5.9	35.3	38.2
	28	The participation of individuals in recycling efforts can be increased through the education provided in schools.	1	29.9	62.7	4.5	3.0	0
			2	33.3	54.0	11.1	1.6	0
			3	47.0	39.4	4.5	6.1	3.0
			4	70.6	26.5	0	2.9	0

A: Strongly Agree. B: Agree. C: Neutral. D: Disagree. E: Strongly Disagree

Table 4 indicates that the majority of first, second, third and fourth year students at the Department Elementary School Science Education were concerned about the possibility that future generations might not be able to use natural resources due to their depletion, and would support investments for recycling even if they entailed higher taxes. The majority of these students also had positive attitudes about the belief that the recycling of solid wastes will reduce the pressures on natural resources; that the participation of individuals to recycling efforts can be increased through the education provided in schools; and that the recycling of solid wastes will actually contribute to the country's economy.

According to the study results, the large majority of the students in all years exhibited an attitude that reducing the amount of solid wastes is not really possible in the present-day world. Some of the first and third year students (34.3% and 30.3%, respectively) were indecisive about the statement that that effective recycling practices can only be ensured through legal regulations, while a some second and fourth year students (36.5% and 29.4%, respectively) agreed with this statement. However, there was also a considerable portion of fourth year students (27.9%) who disagreed with this view. Most of the second, third, and fourth year students disagreed with the view that products obtained through recycling (i.e. recycled products) have negative effects on human health, while a considerable portion of first year students (40.3%) were indecisive about this view.

Table 5 shows the percentage (%) distribution of the science education students' responses to the 11-item "Interest and Awareness" factor of the scale.

Table 5. The percentage (%) distribution of the students' responses to the items in the "Interest and Awareness" factor.

Factor's Name	Item No	Items	Grade	A	B	C	D	E
				%	%	%	%	%
Interest and Awareness	2	I am aware of the environmental problems caused by solid wastes..	1	28.4	68.7	3.0	0	0
			2	27.0	60.3	9.5	1.6	1.6
			3	27.3	59.1	3.0	7.6	3.0
			4	64.7	32.4	0	0	2.9
	4	I do not think about future generations when spending and consuming.	1	0	4.5	4.5	61.2	29.9
			2	0	1.6	7.9	47.6	41.3
			3	0	16.7	6.1	33.3	43.9
			4	0	0	2.9	32.4	64.7
	6	Solving problems relating to solid wastes is the government's task.	1	6.0	29.9	22.4	25.4	16.4
			2	7.9	17.5	23.8	39.7	11.1
			3	6.1	13.6	27.3	40.9	12.1
			4	13.2	29.4	5.9	35.3	16.2
	8	I do not believe that solid wastes pose a problem for our country.	1	4.5	1.5	0	47.8	46.3
			2	0	4.8	4.8	42.9	47.6
			3	1.5	12.1	7.6	37.9	40.9
			4	2.9	0	2.9	20.6	73.5
	9	Even when there are separate recycling containers in my surroundings, I do not bother sorting them accordingly.	1	0	3.0	9.0	50.7	37.3
			2	1.6	1.6	3.2	57.1	36.5
			3	1.5	12.1	3.0	43.9	39.4
			4	1.5	2.9	4.4	32.4	58.8
	14	I am aware of the environmental harm caused by waste batteries.	1	46.3	47.8	3.0	1.5	1.5
			2	36.5	52.4	4.8	1.6	4.8
			3	48.5	37.9	3.0	3.0	7.6
			4	72.1	19.1	2.9	0	5.9
	17	I would not consider buying a product obtained through recycling (i.e. a recycled product).	1	0	9.0	34.3	44.8	11.9
			2	1.6	6.3	27.0	52.4	12.7
			3	0	7.6	30.3	39.4	22.7
			4	0	1.5	4.4	41.2	52.9
	23	I am concerned when solid wastes are not properly recycled and reutilized.	1	9.0	65.7	22.4	3.0	0
			2	11.1	68.3	19.0	1.6	0
			3	30.3	53.0	10.6	1.5	4.5
			4	41.2	48.5	7.4	2.9	0
	25	I do not think that I have sufficient awareness about recycling.	1	10.4	34.3	25.4	26.9	3.0
			2	9.5	42.9	25.4	19.0	3.2
			3	0	48.5	19.7	18.2	13.6
			4	1.5	16.2	8.8	42.6	30.9
	31	I am only bothered by wastes that I see on my own street.	1	4.5	3.0	4.5	38.8	49.3
			2	3.2	7.9	4.8	49.2	34.9
			3	0	12.1	7.6	39.4	40.9
			4	0	5.9	2.9	35.3	55.9
	32	I am not interested in the solid waste disposal procedures implemented in my city.	1	0	11.9	17.9	61.2	9.0
			2	0	11.1	23.8	42.9	22.2
			3	0	21.2	10.6	45.5	22.7
			4	0	7.4	13.2	36.8	42.6

A: Strongly Agree. B: Agree. C: Neutral. D: Disagree. E: Strongly Disagree

Table 5 indicates that the majority of first, second, third, and fourth year students at the Department of Elementary School Science Education were aware of the environmental problems caused by waste batteries and concerned about solid wastes not being properly recycled and reutilized. In addition, the majority of these students viewed solids wastes as a problem for the country; showed interest in the solid waste disposal procedures implemented in their city; were willing to buy products obtained through recycling (i.e. recycled products); and were willing to sort wastes according to their respective recycling containers. The students thus expressed positive attitudes on all these points. The majority of the students also described that they were concerned about wastes in streets other than their own house's street, thus illustrating a positive attitude on this

subject as well. Fourth year students in particular expressed the most positive and aware attitude on all these points.

While there were students in all years who believed that solving issues related to solid wastes is not solely the government's task, there was a portion of first, second, third and fourth year students who were indecisive about this topic (22.4%, 23.8%, 7.3%, and 5.9%, respectively). Most first, second, and third year students expressed that they lacked sufficient awareness about recycling, while the majority of fourth year students described themselves as having sufficient awareness on this subject.

CONCLUSION AND DISCUSSION

It was determined that the attitudes of science education students participating in the study about the recycling of solid wastes varied significantly depending on their current year, with fourth year students exhibiting the most positive attitudes. An evaluation of the courses in the Department of Science Education of the university where this study was conducted revealed that, within the frame of the third year course entitled "Special Topics in Chemistry," the students were briefly taught about recycling when covering the subject of polymer chemistry. In addition, the fourth year elective course entitled "Chemical Wastes and Environmental Pollution" also covers the subject of solid wastes and recycling. We believe that these courses (especially the second one) were partly responsible for the positive difference – in other words, the more positive attitude – observed among fourth year students.

Based on the responses given to the items of the "Initiative and Participation" factor, it was determined that the students had initiative concerning the recycling of solid wastes; that they were willing to inform and encourage their families and friends about recycling; that they were willing to find solutions for problems relating to solid wastes; and that they were interested in the legal regulations about solid wastes and recycling. Responses to the items of the "Beliefs" factor similarly illustrated that the students were concerned about the depletion of natural resources and the subject of sustainable growth, and that they consequently supported investments regarding recycling, while also believing that recycling would positively contribute to the country's economy. Furthermore, most of the students held the view that, in parallel to the increase in population, the amount of solid wastes generated by humans will not decrease. The large majority of the students also had a positive attitude towards the view that using recycled products does not pose any problems for human health. Responses to the items of the "Interest and Awareness" factor indicated that the students were generally aware of the serious environmental problems caused by solid wastes, and that they believed that efforts to provide a livable world for future generations should begin with individual efforts such as sorting solid wastes at home. Responses in this factor clearly illustrated the students' intention in demonstrating the necessary efforts for addressing problems relating to solid wastes.

We believe that the participating students' positive attitudes towards the recycling of solid wastes stemmed primarily from the fact that they were adequately informed and knowledgeable about this subject. Simmons and Midmar (1990) previously described that individuals taking part in recycling efforts generally have high environmental awareness. In addition, Domina and Koch (2002) described that recycling efforts further increased the motivation of individuals on environment-related subjects and issues.

To ensure the preservation of the environment and natural resources, and to raise individuals who are aware of the importance of sustainability, it is necessary to train teachers and instructors who are knowledgeable about sustainability, and who possess the necessary awareness to transform sustainability into a lifestyle. In addition, these teachers need to be supported with environmental education programs that allow elementary school students to acquire knowledge on environmental subjects, and to thereby develop a sense of responsibility towards the environment (Lord, 1999; Moseley, Reinke, & Bootout, 2002; Slingsby & Baker, 2003).

To allow science education students – the teacher candidates of the future – to gain positive attitudes about the recycling of solid wastes and to develop a higher level of awareness towards the environment, these students need to be provided with educational programs that will encourage them to consider environmental issues at a social and global scale, while also enabling them to acquire the necessary skills and knowledge for addressing, and even solving, these problems.

References

- Domina, T., & Koch, K. (2002). Convenience and frequency of recycling: Implications for including textiles in curbside recycling programs., *Environment and Behavior*, 34 (2): 216-238.
- Karatekin, K. (2013). Öğretmen adayları için katı atık ve geri dönüşüme yönelik tutum ölçeğinin geliştirilmesi: geçerlik ve güvenilirlik çalışması. *Uluslararası Avrasya Sosyal Bilimler Dergisi*, 4(10), 71-90.
- Kayranlı, B., Tankut, İ. & Pampal, S. (2003). Endüstriyel katı atıklar ve atık geri dönüşüm borsasının işletilmesi. 5. Ulusal Çevre Mühendisliği Kongresi, Adana.
- Kesicioğlu, S. O., & Alisinanoğlu F. (2009). 60-72 aylık çocukların çevreye karşı tutumlarının çeşitli değişkenler açısından incelenmesi. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi*, 10 (3), 37-48.
- Kışlalioğlu, M., & Berkes, F. (2010). *Çevre ve ekoloji*. İstanbul: Remzi Kitabevi.

- Kocataş, A. (2012). Ekoloji çevre biyolojisi. Bursa: Dora Yayıncılık.
- Lord, T.R. (1999). A comparison between traditional and constructivist teaching in environmental Science. *The Journal of Environmental Education*, 30 (3), 22-28.
- Meriç, G., & Kayranlı, B. (2003). Endüstriyel katı atık yönetimi. 5. Ulusal Çevre Mühendisliği Kongresi, Adana.
- Moseley, C., Reinke, K., & Bootout, V. (2002). The effect of teaching outdoor environmental education on preservice teacher' attitudes toward self-efficacy and outcome expectancy. *Journal of Environmental Education*, 34(1), 9-15.
- Peyton, R.B., H. Campa III, Winterstein, S.R., Peyton, M.D., & Peyton, V. (1995). Environmental education module on biological diversity. *Environmental Education Section, United Nations Educational, Scientific and Cultural Organization*.
- Simmons D., & Widmar R. 1990. Motivations and barriers to recycling. *Environmental Education*, 22(1),13-28.
- Slingsby, D., & Baker, S. (2003). Making connection: biology, environmental education and education for sustainable development. *Journal of Biology Education*, 38(1), 4-6.
- Spiegelman, H., & Sheehan, B. (2004). The future of waste. *BioCycl*, 45(1), 59.

Developing A Language Test: Classifying Examinees Into Categories

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ABSTRACT

The objective of many language tests is to classify examinees into categories, e.g. with respect to the Common European Framework. The paper focuses on how to develop a test that maximizes the probability of correct classification for a pre-defined value of the cut-off score, i.e. the score which separates examinees into categories. This is a computationally complex problem difficult to solve by exact optimization methods, so metaheuristic algorithms may prove a better option here. Specifically, this paper explores the use of simulated annealing, adapted to the nature of the problem.

Keywords: language, education, examinees

INTRODUCTION

This paper focuses on the use of simulated annealing when developing a test whose aim is to classify examinees into categories according to their performance in the area being tested. A common example of such tests are language tests which classify examinees into the categories defined by the Common European Framework of Reference.

The Framework specifies six levels of language proficiency: A1, A2, B1, B2, C1 and C2. This paper deals with a specific situation where our aim is to classify examinees into only two categories: those who have reached the B2 level and or those who have not. However, the methods suggested below are applicable even when classifying examinees into more than two categories. First, let B2* be the category containing levels B2, C1 and C2, and let B1* be the category containing levels A1, A2, and B1. Let us assume that the test which is to be developed consists entirely of items with a single correct answer, each worth 1 point when answered correctly and 0 points when answered incorrectly.

In the context of language testing, we often use the principles of Measurement Decision Theory (MDT), which are explained in the next section. For now, it is sufficient to say that when a test consists of items whose difficulty estimates are known from prior testing (e.g. pilot testing), it is possible to use the principles of MDT to determine what score is necessary for an examinee to obtain in order to be classified as belonging to a particular category. The score value which separates one category from another is called the cut-off score. The methods to calculate the cut-off score after the test has been administered are fairly straightforward. The problem arises when the cut-off score is determined before the actual testing (e.g. when it needs to be kept constant across several test administrations) and the test must be developed accordingly. In addition, the test often needs to meet other requirements concerning its content (e.g. a specific number of items testing particular skills such as reading, listening etc.) or its statistical properties (e.g. having a satisfactory value of the mean item discrimination, i.e. the power to differentiate between respondents of different abilities). It is also often necessary to prepare several tests at the same time for different test administrations. It is very difficult to develop a test, or several tests, which would meet all the above-mentioned criteria, without a suitable algorithm. Thus, the aim of this paper is to design an algorithm which will enable us to choose such items from a pool of items with known estimates of difficulty for each category (B1*, B2*) and with known estimates of item discrimination, so that all the resulting tests meet the following criteria:

- no item is included in more than one test;
- the mean item discrimination in each test is greater than or equal to a certain minimum value;
- the number of items in each test corresponds to the test specification; should the test cover several domains (reading, listening etc.), the number of items testing each domain corresponds to the test specification;
- the cut-off score in each test is as close as possible to a certain pre-defined value.

MEASUREMENT DECISION THEORY

As the algorithm described below is based on the principles of Measurement Decision Theory (MDT), these will now be briefly explained. MDT was developed by Rudner (2009) and is based on the Bayes theorem, which can be mathematically formulated as follows:

$$P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)},$$

where $P(A)$ and $P(B)$ are the probabilities of events A and B , $P(A|B)$ is the probability of A given that B is true and $P(B|A)$ is the probability of B given that A is true. In our case, A means that an examinee belongs to a particular category and B means that an examinee obtained a certain test score.

To calculate the probability that an examinee belongs to $B1^*$ or $B2^*$ if they have obtained a certain test score, we need the following information:

- the probability that a randomly chosen examinee belongs to $B1^*$ or $B2^*$;
- the probability that an examinee obtains this test score if they belong to $B1^*$ or $B2^*$.

To find out the former, all we need to know is the distribution of categories in the target population. Finding out the latter is substantially more complicated though, because the probability of obtaining a certain test score depends on the parameters of items in the test.

Let us assume the test contains k items. Let r_i be the mean item difficulty for $B1^*$ (i.e. the proportion of examinees belonging to $B1^*$ who can answer item i correctly) and let s_i be the mean item difficulty for $B2^*$ (i.e. the proportion of examinees belonging to $B2^*$ who can answer item i correctly). As each item is worth one point, r_i and s_i also denote the mean item score for $B1^*$ and $B2^*$ respectively. The mean test score is then the sum of mean item scores across all k items.

To find the test score variance, we need the covariance matrix of the items it contains. Let Σ_{B1^*} and Σ_{B2^*} be the item covariance matrices for $B1^*$ and $B2^*$ respectively. The diagonal elements of these matrices are the variances of the item scores, the off-diagonal elements are the covariances of the item scores between items. The variance of the score in item i can be calculated as $r_i(1 - r_i)$ for $B1^*$ and $s_i(1 - s_i)$ for $B2^*$, because the answer to an item follows a Bernoulli distribution (1 = correct answer, 0 = incorrect answer). The test score variance is then calculated as $\mathbf{e}^T \Sigma_{B1^*} \mathbf{e}$ for $B1^*$ and $\mathbf{e}^T \Sigma_{B2^*} \mathbf{e}$ for $B2^*$, where \mathbf{e} denotes an all-ones vector with k elements.

Let us denote by μ_{B1^*} and μ_{B2^*} the expected value of the test score for $B1^*$ and $B2^*$ respectively. Accordingly, the test score variance shall be denoted by $\sigma_{B1^*}^2$ and $\sigma_{B2^*}^2$. Let us assume that the test score in each category follows a normal distribution. Hence:

$B1^*$ test score $\sim N(\mu_{B1^*}, \sigma_{B1^*}^2)$, where $\mu_{B1^*} = \sum_{i=1}^k r_i$ and $\sigma_{B1^*}^2 = \mathbf{e}^T \Sigma_{B1^*} \mathbf{e}$;
 $B2^*$ test score $\sim N(\mu_{B2^*}, \sigma_{B2^*}^2)$, where $\mu_{B2^*} = \sum_{i=1}^k s_i$ and $\sigma_{B2^*}^2 = \mathbf{e}^T \Sigma_{B2^*} \mathbf{e}$.

The probability that an examinee who belongs to $B1^*$ gets a particular test score is then equal to the value of the probability density function of the normal distribution with mean μ_{B1^*} and variance $\sigma_{B1^*}^2$; the same holds true for $B2^*$. In order for a particular value of test score to be the cut-off score, both the categories must have an equal probability of obtaining it, which makes the probability equal to 0.5 in the case of two categories. Let h be the value of cut-off score. Hence,

$$P(B1^*|h) = \frac{d(h|B1^*) \cdot P(B1^*)}{d(h|B1^*) \cdot P(B1^*) + d(h|B2^*) \cdot P(B2^*)} = 0.5,$$

where

$P(B1^*|h)$ denotes the probability that an examinee belongs to $B1^*$ if the value of their test score is h ;

$d(h|B1^*)$ denotes the value of the probability density function for the cut-off score h given that an examinee belongs to $B1^*$, where the test score follows a normal distribution with mean μ_{B1^*} and variance $\sigma_{B1^*}^2$;

$d(h|B2^*)$ denotes the value of the probability density function for the cut-off h score given that an examinee belongs to $B2^*$, where the test score follows a normal distribution with mean μ_{B2^*} and variance $\sigma_{B2^*}^2$;

$P(B1^*)$ denotes the probability that a randomly chosen examinee belongs to $B1^*$;

$P(B2^*)$ denotes the probability that a randomly chosen examinee belongs to $B2^*$.

The equation for $P(B2^*|h)$ is analogous.

OPTIMIZATION MODEL

Let us now formulate a mathematical model for the above mentioned problem. Our goal is to choose such items from a pool of items with known estimates of difficulty for each category ($B1^*$, $B2^*$) and with known estimates of item discrimination, so that the cut-off score in all the resulting tests is as close as possible to a certain pre-defined value and at the same time the tests meet other requirements concerning their content and other statistical properties.

Let us assume that we need to develop two tests, each testing k different domains (reading, listening etc.), and altogether we have n items to choose from. The content specification of both tests is equal, i.e. every test should contain the same number of items in each of the domains being tested, and these are also equivalent in both tests. Let us also assume that we want some of those items to be included in the test in any case, for example for their good content. Last but not least, we want the cut-off scores in the two tests to be equal to h_1 and h_2 respectively.

The model includes three constraints:

- (1) No item is included in more than one test.
- (2) The number of items in each test must correspond to the test specification, i.e. each test must contain a specific number of items in each of the domains being tested.
- (3) The mean item discrimination of each test must be greater than or equal to a certain value.

Let x_i, y_i be binary variables, where $x_i = 1$ if item i is included in the first test, $y_i = 1$ if item i is included in the second test.

Parameters

- r_i = mean score in item i for B1*;
 s_i = mean score in item i for B2*;
 Σ_{B1*} = item covariance matrix for B1*;
 Σ_{B2*} = item covariance matrix for B2*;
 q_i = discrimination parameter for item i ;
 t_{ij} = 1, if item i tests domain j , 0 otherwise, where $j = 1 \dots k$;
 h_1 = pre-defined cut-off score in the first test;
 h_2 = pre-defined cut-off score in the second test;
 Q = minimum mean item discrimination in each test;
 T_j = the number of items testing domain j which should be included in each test.

Objective function

minimize

$$z = [P(B1^*|h_1) - 0.5]^2 + [P(B1^*|h_2) - 0.5]^2, \text{ i.e.}$$

$$z = \left[\frac{d(h_1|B1^*) \cdot P(B1^*)}{d(h_1|B1^*) \cdot P(B1^*) + d(h_1|B2^*) \cdot P(B2^*)} - 0.5 \right]^2 + \left[\frac{d(h_2|B1^*) \cdot P(B1^*)}{d(h_2|B1^*) \cdot P(B1^*) + d(h_2|B2^*) \cdot P(B2^*)} - 0.5 \right]^2$$

where

$d(h_1|B1^*)$ denotes the value of the probability density function of the normal distribution with mean $\sum_{i=1}^n x_i r_i$ and variance $\mathbf{x}^T \Sigma_{B1^*} \mathbf{x}$ for h_1 ;

$d(h_2|B1^*)$ denotes the value of the probability density function of the normal distribution with mean $\sum_{i=1}^n y_i r_i$ and the variance $\mathbf{y}^T \Sigma_{B1^*} \mathbf{y}$ for h_2 ;

$d(h_1|B2^*)$ denotes the value of the probability density function of the normal distribution with mean $\sum_{i=1}^n x_i s_i$ and variance $\mathbf{x}^T \Sigma_{B2^*} \mathbf{x}$ for h_1 ;

$d(h_2|B2^*)$ denotes the value of the probability density function of the normal distribution with mean $\sum_{i=1}^n y_i s_i$ and variance $\mathbf{y}^T \Sigma_{B2^*} \mathbf{y}$ for h_2 .

In order for h_1 and h_2 to be the cut-off scores, an examinee obtaining them must have a 0.5 probability of belonging to B1* when taking the corresponding test. Therefore, our goal is to choose such items for both the tests so as to minimize the difference between the probability that an examinee belongs B1* when obtaining these scores, and 0.5. Specifically, the objective function is formulated as the sum of squared differences.

Subject to

- (1) $x_i + y_i \leq 1 \quad \forall i = 1 \dots n;$
- (2) $\sum_{i=1}^n t_{ij} x_i = T_j \quad \forall j = 1 \dots k;$
 $\sum_{i=1}^n t_{ij} y_i = T_j \quad \forall j = 1 \dots k;$
- (3) $\sum_{i=1}^n q_i x_i \geq Q;$
 $\sum_{i=1}^n q_i y_i \geq Q;$

$x_i \in \{0, 1\}$ if item i is included in the first test, then $x_i = 1$, otherwise $x_i = 0 \quad \forall i = 1 \dots n;$
 $x_i = 1$ for items which have to be included in the first test $\forall i = 1 \dots n;$
 $y_i \in \{0, 1\}$ if item i is included in the second test, then $y_i = 1$, otherwise $y_i = 0 \quad \forall i = 1 \dots n;$
 $y_i = 1$ for items which have to be included in the second test $\forall i = 1 \dots n;$

SOLUTION

We may consider using some common optimization methods to solve this problem, e.g. a modification of the branch and bound algorithm (Chinneck, 2004), but the problem is computationally complex due to the nonlinearity of the objective function and the presence of binary variables; nonlinear optimization problems with binary variables are known to be NP-hard even if the objective function is quadratic and constrains linear (Murray and Kien-Ming, 2008). Furthermore, from the point of view of the test developer, it might be desirable to find not only one optimal solution, but several satisfactory solutions, from which the developer could choose the best one according to other test properties such as their content. That is why metaheuristic algorithms may prove a better option here. Specifically, we used simulated annealing to solve the problem.

Simulated annealing is described in more depth in Bertismas and Tsitsiklis, (1993). Its name and inspiration comes from annealing in metallurgy. First, we define four input parameters: initial temperature $T > 0$, cooling rate s belonging to the interval $(0, 1)$, number of neighbour solutions checked in each iteration h and total number of iterations N .

Let x_0 be the initial solution, which meets all the constraints specified above, and let x^* be the best solution found by the algorithm. Each solution x is a matrix with two columns, where each column is a binary vector indicating which items are included in the corresponding test. The value of 1 in row i and column j means that item i is included in test j . Let $f(x)$ denote the value of the objective function for x .

The main steps of the algorithm, modified with respect to the nature of our problem, are as follows.

Initialize ($T, x = x_0, x^* = x_0$)

for $i = 1$ to N

for $j = 1$ to h

 Generate a neighbouring solution x' by replacing one item in one of the tests by another. Should this item be included in the other test as well, replace it by the item removed from the first test. Otherwise, the other test remains unchanged.

if the new solution meets all the constraints then

if $f(x') < f(x)$ **then** $x = x', x^* = x'$

else if $e^{-\Delta/T} > \text{random}(0,1)$, where $\Delta = f(x') - f(x)$, **then** $x = x'$

$T = T \cdot s$

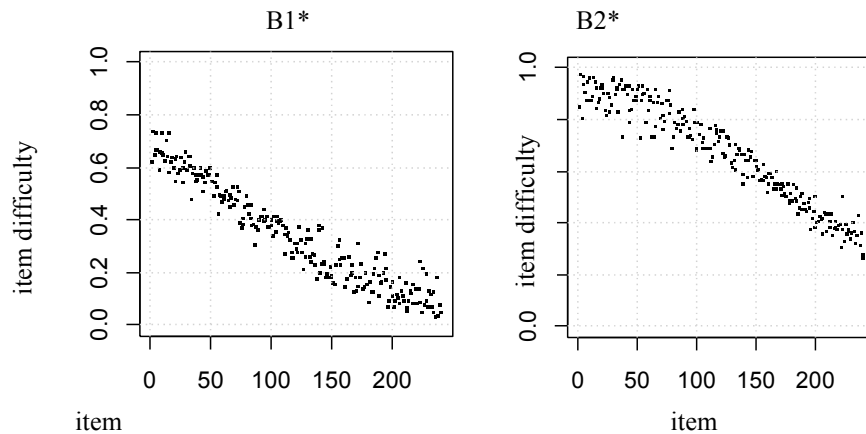
RESULTS

Let us now verify the suitability of the method described above. Our aim will be to develop two tests, with 60 items each, which should enable us to decide whether an examinee has reached at least the B2 level according to the Framework. Let us suppose that 75 percent of people in the target population belong to B1* and 25 percent of people belong to B2*. The cut-off score in the first test is set to h_1 points and the cut-off score in the second test is set to h_2 points where $h_1 = h_2$ are all integer values in the interval $(28, 42)$. So the optimization model formulated above will be solved for 15 different values of pre-defined cut-off scores, while the data and the other input parameters of the model will remain unchanged.

Both the tests also need to comply with the following specification: each must contain 20 items testing reading comprehension and chosen by the test developer prior to the use of the algorithm, 10 items testing grammar, 10 items testing phrases for conversation, 10 items testing listening skills and 10 items testing vocabulary, i.e. 5 different domains. This specification reflects the fact that most language tests contain several domains, some of them usually similar to the ones chosen in this case, even though the actual specification varies from test to test. As for the last four domains (grammar, conversation, listening, vocabulary), the items will be chosen by the algorithm from an item pool containing 50 items from each domain. To sum up, the aim is to choose 40 items from an item pool consisting of 200 items in such a way that when combined with the 20 items chosen by the test developer beforehand we get two tests satisfying the following conditions:

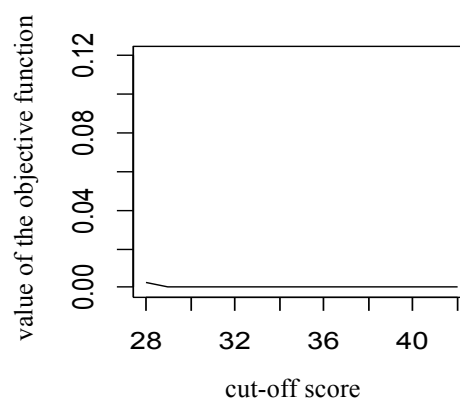
- no item is included in more than one test;
- the mean item discrimination in each test is greater than or equal to 0.45;
- the number of items testing each domain corresponds to the test specification;
- the cut-off score in the first and second is as close as possible to h_1 and h_2 respectively.

The data used during the verification process were obtained as follows. First, we randomly generated the parameters of item difficulty and item discrimination for the required number of items. Then we generated a matrix containing the answers of 200 respondents from B1* and 200 respondents from B2* to those items and calculated the estimates of item difficulty, item discrimination and item covariance matrices. The resulting sample item difficulties for each category are depicted below, mean sample item discrimination is equal to 0.57 (in reality, there are usually some problematic items with low or negative discrimination, but we will not consider those now).

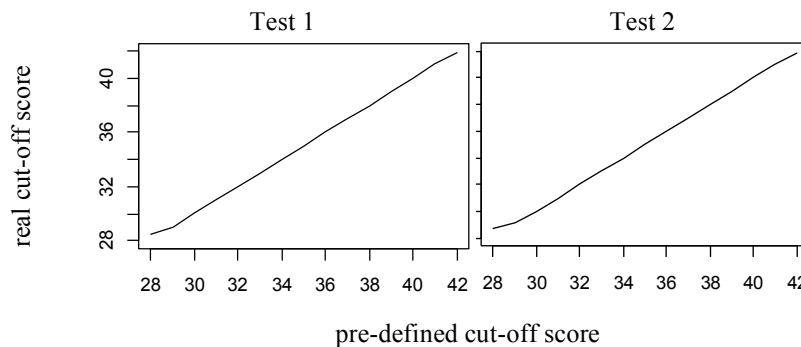


Graph 1: Estimated item difficulties for item used in the simulation

The effectiveness of the algorithm depends on the choice of the input parameters, which are usually a compromise between the effort to find the best solution and to find a good solution in a reasonably short time. The input parameters used in this case were: $T = 100$, $s = 0.8$, $h = 10$, $N = 100$. We replicated the process 10 times for each value of the pre-defined cut-off score. The mean values of the objective functions and the mean values of the corresponding cut-off scores of the best solutions are depicted on graph 2 and 3 respectively. We can see that the algorithm found a satisfactory solution for all the pre-defined cut-off score values (for the values from 30 to 41, the resulting cut-off score differed from the pre-defined value by less than 0.1 points).



Graph 2: Mean values of the objective function



Graph 3: Mean values of the cut-off score of the best solution

CONCLUSIONS

The paper focused on the development of tests whose aim is to classify examinees into different categories. In this context, we often use the principles of Measurement Decision Theory, so these were first briefly explained. The aim of this paper was to find a way to maximize the probability of correct classification for pre-defined values of the cut-off score, i.e. the score which separates examinees into different categories. This was formulated as a nonlinear programming problem with binary variables. Such problems are difficult to solve by common optimization algorithms, as they are computationally very complex, so simulated annealing was used instead. This algorithm enabled us to find a satisfactory solution for all the pre-defined values of the cut-off score while respecting other requirements often placed on tests concerning their content and other statistical properties.

References

- Bertsimas, D., Tsitsiklis, J. (1993). Simulated Annealing. In *Statistical Science* [online], Vol. 8, Number 1, pp.10-15. Available: <http://www.mit.edu/~dbertsim/papers/Optimization/Simulated%20annealing.pdf>
- Chinneck, J. (2004). Practical optimization. In *Binary and Mixed-Integer Programming* [online], Chapter 13. Carleton University, Canada. Available: <http://www.sce.carleton.ca/faculty/chinneck/po/Chapter13.pdf>
- Murray, W., Kien-Ming, N. (2008). An algorithm for nonlinear optimization problems with binary variables. In *Springer* [online]. Available: http://web.stanford.edu/class/cme334/docs/2012-10-22-murray_ng_binary.pdf
- R Core Team: *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. Available: <http://www.R-project.org/>.
- Rudner, L. M. (2009). Scoring and Classifying Examinees Using Measurement Decision Theory. In *Practical Assessment & Research Evaluation* [online], Vol. 14, Number 8, ISSN 1531-7714. Available: <http://pareonline.net/getvn.asp?v=14&n=8>
- Whitley, D. (2003). A Genetic Algorithm Tutorial. In *Computer Science Department* [online], Colorado. Available: <http://www.cs.colostate.edu/~genitor/MiscPubs/tutorial.pdf>

Developing With Residual Practice In EFL Classrooms

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ABSTRACT

This article explores the concept of residual practice as a means of understanding the importance of daily experience on classroom management. The suggested theory can adequately illuminate the nature and process of learning while teaching in classrooms. This article aims to provide residual practice as a comprehensive framework for evaluating the impact of daily experience on classroom management. Residual practice is a voluntary, collaborative process in which a teacher and two professional colleagues explore and reflect on learning and teaching practice. Specifically, the suggested model which emphasizes the dialectic process with a teacher and two professional colleagues represents that core features of effective classroom management is based on residual practice which requires the teacher and two professional colleagues as feedback receiver and provider. In this study the designed model was implemented and the semi structured interviews were given to five EFL teachers who taught in multilingual classrooms. The findings indicated that the suggested model helped the participant EFL teachers develop new perspectives in their classroom management strategies and contributed to their professional development. Furthermore, some implications were provided for teachers in Cyprus.

Keywords: Residual practice, teaching identity, peer coaching, professional development

INTRODUCTION

Peer coaching is a confidential process through which two or more professional colleagues work together to reflect on current practices; expand, refine, and build new skills; share ideas; teach one another; conduct classroom research; or solve problems in the workplace (Robinson, 1991). It is mostly agreed that when teachers improve themselves, their practice will improve and their students' success will increase as well (Zwart, Wubbels, Bergen & Bolhuis 2007). Richardson and Placier (2001:920) claim that "changes in beliefs appear often to precede changes in practices, or that the process of changing beliefs and practices is at least interactive and synergistic". Peer coaching has nothing to do with evaluation. It is not intended as a remedial activity or strategy to "fix" teachers. Several school systems have supported peer coaching as a way to increase feedback about instruction and curriculum. Although there are similarities residual practice is not peer coaching. Instead the residual practice is the experience or practice left over at the end of the teaching process. The residual practice goes around five questions that the teacher is required to ask herself/himself; (1)What did you believe in? (2) What happened? (3) What's left over? (4) What would you do if...? (5) What will you do with what you learnt? In this learning process, both the successful practitioner and the school leader are expected to act as a feedback receiver or provider. It should be highlighted that the degree of formality among these people is required to be equalized by focusing on the actions not the individual teacher personally.

The primary benefit of residual practice for teachers is a deeper understanding of their own teaching style and its impact on their classroom management. Another specific benefit may include the professional development process of teachers. Supovitz (2001) suggested that logic behind professional development is that high-quality professional development will change teaching in classrooms, which will, in turn, increase student achievement. Moreover, recent literature has claimed that teachers' knowledge gained from professional development influences teaching practice (Blank & Alas, 2007; Yoon, Dun- can, Lee, Scarloss, & Shapley, 2007).

Residual practice provides an important starting point for classroom management. A well-managed classroom includes continuum of strategies to establish clear learning goals which aims to develop appropriate behaviour including contingent and specific praise, group contingencies and behaviour contracts. Continuum of strategies is also helpful to reduce the amount of inappropriate behaviour to occur in the classrooms. Residual practice is presented to explore the usefulness of teachers' daily experiences. Residual practice was inspired by the teachers' dissatisfaction with classroom management techniques and the inability to account for how people learn and perceive new activities, knowledge, and skills without engagement in formal educational or training processes. The idea of residual practice has served as an extremely useful practical and theoretical resource in studying learning in classrooms and it has enabled us to explore its applicability in a range of contemporary classrooms in Cyprus. The idea also encourages informal learning processes with an experienced staff. Issues

will be discussed by colleagues who value one another's advice or wait for a chance for a discussion since they do not automatically meet each other when they are not teaching. The notion of cycle time is a useful but only partial way of understanding continuity, conflict and innovation in schools in relation to learning from experience. Sometimes teachers change practices without the impact of a new concept. Many of the forces responsible for the on-going evolution of teachers come from external pressures such as the system of the school, learners, curriculum, classroom climate, and the administration of the school. We explore the issue of residual practice as a powerful rationality for producing teaching identities. To build a personal and educational identity both as a learner and as a teacher, we all of a sudden realize how little we have thought about it in all these years. A teaching identity is formed throughout the teaching and learning journey. As it was mentioned before, it is teachers' residual practice through cycle time. It should not be mixed with reflection which means "holding up mirrors to our practice. In other words we need to think about (to reflect on) what we are doing and why (Harmer, 2013 p. 410). It is also not a list of do's and don'ts as Bawcom (2005:50) suggests;

_____	Attending conferences	_____
_____	Getting a certificate/diploma/degree	_____
_____	Peer Observations	_____
_____	Peer Counselling (time spent talking to colleagues)	_____
_____	Lesson planning/ creating materials	_____
_____	Reading professional journals/books	_____
_____	Time with students (outside the classroom)	_____
_____	Time getting to and from place of work	_____
_____	Writing articles	_____
_____	Syllabus design/writing a (text) book	_____
_____	Doing (classroom) research	_____
_____	Doing administrative duties	_____

Figure 1: Professional priorities (from Bawcom 2005:50)

It helps teachers consider the many factors that shape who they are as teachers. A teaching identity can be used to deepen teachers' understanding of themselves, students, head teachers, and the system of the school. Sharing their own teaching identity charts with peers can help them build not only their own teaching practice but also relationships among teachers in institutions. In this way, identity charts can be utilized as an effective school community-building tool.

Multiple variables influence an individual teacher's behaviors and attitudes. These overlapping categories of teaching identity include, but are not limited to, characteristics such as approach, method, strategy, character, and level of ability. We need to be careful, of course, that generalizations about teaching identity do not substitute one set of assumptions for another. Although teachers who have teaching characteristics in common often share norms of behavior, attitudes, or speaking styles, not every teacher endorses these views. It is important to remember that even those who do identify with a particular group will not share the same thoughts or actions in practice. Teachers' values define their practice, not the values of the policy-makers. A teacher's primary responsibility is to teach in the classroom. Teachers' sense of purpose has deeply personal, intellectual, and moral dimensions that must be more fully recognized (Collay, 1988, 1989; Grumet, 1980; Nieto, 2003; Shields, 2004; Zinn, 1997). Much of the literature about teacher sustainability identifies teacher development of classroom practice as critical to their career satisfaction (Shen, 1997). Still other researchers suggest teachers thrive on a more expanded role that includes collaborating with colleagues and influencing school-wide decisions (Barth, 1999; Elmore, 2002; Holloway, 2003).

Research on teachers' actions rather than their roles and responsibilities offer a bridge for teachers who experience conflict between classroom management and teaching identity. 'Good teaching cannot be reduced to technique; good teaching comes from identity and integrity of the teacher' Palmer J. Palmer (1998).

This study has produced a number of fairly straightforward examples of professional development strategies such as residual practice, teaching identity, and teaching identity charts. These proposed theories could be modified through experience and brought directly to the classroom practice. Drawing comparisons with the concepts of earlier studies, the present paper investigates what impact, if any; residual practice has had on teachers' perceptions of their professional developments.

METHODOLOGY

This study aimed to explore the concept of residual practice as a means of understanding the purposively selected EFL teachers' development of their classroom management skills. For this purpose, a case study approach was adopted. This approach helped the researcher to investigate the participant teachers' perceptions regarding their classroom management skills in depth. The participants of the study participated voluntarily in this investigation. Prior to the investigation the participant teachers' informed consent was received. In this investigation one experienced teacher worked with four novice teachers to evaluate, give and receive feedback from each other on each other's daily experiences on classroom management. The experienced teacher was a male teacher with 21 years of experience in teaching and the other participants were two male and two female teachers with only one year experience in teaching. In this design of collaboration, one experienced teacher worked with two novice colleague in each meeting. In other words, one experienced teacher collaborated with two novice teachers in order to understand, evaluate, receive and give feedback on each other's daily classroom practices. The experienced teacher met every two colleagues every fortnight. In this study, the data was collected through reflective reports and teaching identity charts which yielded rich evidence about the residual practice and the participants were also given 30 minutes semi-structured interviews for the purpose of collecting data about the participant teachers' subjective views and evaluation regarding the process of development in their management skills after the implementation of the model. During the investigation, the participant teachers were asked to keep reflective reports about the classroom management issues, particularly about the classroom management difficulties they faced during teaching daily. They were also asked to fill in the teaching identity charts which formed a basis for them to look at, evaluate and compare their previous learning and experiences about classroom management practices and their present classroom management practices. After 8 weeks of collaboration, the participant teachers were interviewed to collect data about their subjective views regarding the designed model, residual practice. The collected data was analysed qualitatively. Each case was analysed and then a cross-case analysis was employed to see the similarities and differences among the participants. Cross-case analysis is a research method that facilitates the comparison of commonalities and difference in the events, activities, and processes that are the units of analyses in case studies (VanWynsberghe & Khan, 2007). Pseudonyms were used for the participant teachers. The following two key research questions were adopted: Why did the participant teachers choose to engage with this designed collaborative model? What did they gain from this process?

FINDINGS AND DISCUSSION

When the participant teachers were asked why they chose to engage with the designed model they mainly emphasized their need for collaborating with their colleagues in their work context. Particularly, the novice teachers expressed their need to improve their classroom management skills. Mike, Philip, Janet and Jill were the novice teachers while Antony was the experienced teacher in this collaboration. Mike said: "I think teachers learn a lot from each other. Sometimes I face with some problem in my classroom that I cannot find answers to from the books. I need someone more experienced than me to ask for advice." Similarly, Jill expressed the need for collaborating with someone who is more experienced than her to guide and help her particularly in the management of her classroom. She stated: "I desperately need guidance in some situations. I try to solve the problems when they arise in the class while teaching based on my theoretical knowledge but I realize that still I should develop more practical strategies most of the time." Philip's view was not much different than Jill in his need for developing more practical strategies to solve the classroom management problems when they arise in class. He said: "What I feel most of the time is that I have the theoretical knowledge for classroom management but I need to develop the practical side of it. Sometimes you need to find how to solve the problems practically...you need to share your experiences and get guidance from someone who is more experienced than you." Janet's view was more based on finding the most appropriate strategies that can work best for your own students besides improving your practical side. She said: "What happens in reality is so different than the knowledge you receive in books. I think, I have theoretical knowledge but I need to learn from more experienced teachers than me about the practical issues." For the experienced teacher Antony: "classroom management depends on the craft knowledge of the teacher that he/she gains and develops throughout experience in teaching." For this reason he expressed his willingness to share his experiences with the novice teachers and help them develop. Besides, he stated that "learning is a lifelong process. Therefore, there is always something he can learn from the novice ones as well."

When the participant teachers were asked what they gained from their engagement with the designed model of collaboration and residual practice, their response were on the positive side. They all indicated that they have gained a lot from this collaboration with each other and the engagement with this model where they kept reflective reports and teaching identity charts. Jill said: “Keeping reflective reports gave me a chance of looking what I am doing in my class in more depth and made me more aware of the problems I face with while teaching...Teaching identity charts helped me compare present my classroom management strategies with the previous ones.” Philip stated that: “When I first started keeping reflective reports they were not so meaningful for me but later I realized that the things I wrote enabled me to look at my classroom practices in management more critically...I found filling in teaching identity charts really useful because they give you a chance to look at your strategies you used before and how far you have changed them in time.” Similarly, Janet and Mike expressed the benefit of keeping reflective reports and filling teaching identity charts. Janet said: “It is the first time I kept reflective reports and used a teacher identity chart but I found them very useful especially when you are not experienced in teaching you need them. They help you develop your management skills practically.” Mike stated that: “I realized that your skills can develop if you are aware of your weaknesses and find ways of improving them. Keeping reflective journals helped my awareness about what I am doing in class and teaching identity charts enabled me to see my development.” As the experienced teacher, Antony expressed the benefits the novice teachers gained in this process of keeping reflective reports, filling in teacher identity charts and collaborating with each other. He said: “I think this process contributed a lot to the novice teachers and me as well. With the help of the reflective reports they kept I was more able to see what kind of management problems they were experiencing and the strategies they were using to solve them. They formed the basis of our discussion and sharing with them. This enabled them to develop their repertoire of management skills. Besides, teaching identity charts enabled them to look at their self- development in management skills.

CONCLUSION

It could be argued that the proposed concepts and practice provide important insights in to the nature of professional development and workplace learning more generally. However, our case study research into complex institutional settings suggests that patterns and forms of participation are highly diverse. There is a need, therefore, for teaching identities to be explored more to find out the sum total of the teaching practice and residual practice. As well as identifying enduring strengths in residual practice, the paper particularly through its analyses of case study data, has identified limitations in its approach that can be usefully addressed and developed. The control and organisation of work will affect teachers’ opportunities to learn. To remove barriers and boundaries which facilitate or inhibit participation is as vital as reflecting on what teachers are doing. Further in depth studies of workplace learning in a wide range of contexts are required if all the issues affecting learning and their inter-relationships are to be fully understood and theorized.

References

- Barth, R. (1999) *The teacher leader*. Providence RI: The Rhode Island Foundation.
- Bawcom, L. (2005) Preventing Stress and Burn-Out. *Modern English Teacher* 14/2.
- Blank, R. K., de las Alas, N., & Smith, C. (2007). *Analysis of the quality of professional development programs for mathematics and science teachers*. Washington, DC: Council of Chief State School Officers.
- Collay, M. (1999) Mediating morality: A new teacher ministers to her students. *Religion and Education*, 26(1), 49-57.
- Elmore, R. F. (2002) *Bridging the Gap between Standards and Achievement: The Imperative for Professional Development*. Albert Shanker Institute
- Grumet, M. (1980) *Bittermilk*. Amherst: University of Massachusetts Press.
- Harmer, J. (2013) *The Practice of English Language Teaching*. Fourth Edition. Pearson Education Ltd.
- Holloway, J. (2003) Sustaining experienced teachers. *Educational Leadership*, 60(8), 87-89.
- Nieto, S. (2003) What keeps teachers going? *Educational Leadership* 60(8), 14-18.
- Palmer, J. (1998) Attentional effects in visual search: Relating search accuracy and search time. In R. Wright (Ed.), *Visual Attention*. New York: Oxford University Press.
- Richardson, V. & Placier, P. (2001). Teacher change. In V. Richardson (ed.) *Handbook of Research on Teaching* (4th edn,pp. 905-947. Washington, DC: American Educational Research Association.
- Robinson, P.C. (1991) *ESP Today: Practitioner’s Guide*. Hemel Hempstead: Phoenix.
- Shen, J. (1997) Teacher retention and attrition in public schools. *The Journal of Educational Research*, 92(2), 81-88.
- Shields, C. (2004). Dialogic leadership for social justice: Overcoming pathologies of silence. *Educational Administration Quarterly*, 40(1), 109-132.
- Supovitz, J. A.: (2001). Translating teaching practice into improved student achievement. *From the capital to the classroom: Standards-based reform in the States*. Fuhrman, S. (eds.).National Society for the Study of Education Yearbook Chicago: University of Chicago Press, Page: 81-98.

- VanWynsberghe, Robert & Khan, Samia (2007). Redefining case study. *International Journal of Qualitative Methods*, 6(2), 1-10.
- Yoon, K. S., Duncan, T., Lee, S. W. Y., Scarloss, B., & Shapley, K. (2007). *Reviewing the evidence on how teacher professional development affects student achievement* (Issues and Answers Report, REL 2007 No. 033). Washington, DC: U.S. Department of Education, Regional Educational Laboratory Southwest.
- Zinn, L. (1997) Supports and barriers to teacher leadership: Reports of teacher leaders. *Teaching and Learning Papers and Reports*. LSCNET. Retrieved 10-06-2005.
- Zwart, R. C., Wubbels, T., Bergen, T. C. M., & Bolhuis, S. (2007). Experienced teacher learning within the context of reciprocal peer coaching. *Teachers and Teaching: theory and practice*, 13(2), 165–187.

Development Of Melodic Progression Skills In Teaching Of Turkish Music Maqams

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ABSTRACT

Turkish music maqams are differentiated from each other due to the note and melodic progressions, they are named and classified according to them. Maqams are divided into three classes according to their structure, including simple, şed (forced to immigrate) and compound. Maqams are differentiated mainly according to the note and the melodic progression. In this context, The note and the melodic progression are offered a different importance on the stage of teaching to students. The notes are sounds including the character of maqams. however, the melodic progression is the notes communities that display the identity of maqam, so the student's musical ability is understood from his/her melodic progression skill. Therefore, making the melodic progression occurs a disciplined maqam education, music listening and musical ability. In my study, Music listening and playing works of the students will be presented to be developed melodic progression skills of the students in maqam.

INTRODUCTION

Deriving from the word “*kıyam*” in Turkish, *maqam* means “the place in which one is located,” “a privileged place” or “a place which is distinguished from other places by its properties” (Kutluğ, 2000, p. 73). This concept constitutes the fundamental property of the sound systems found in Turkish music and in geographies which were influenced by this music. Traditionally, two important elements of Turkish music are *maqam* and *usûl*. The concept of *maqam* constitutes the basis of the Turkish music since *usûl* does not exist in the free forms of Turkish music such as *taksim*, *mevlid*, *gazel* and *kaside*. The concept of *maqam* may be expressed by different terms depending on the geography, culture and time in question. The concept of “*raga*” in Indian music, the term “*destgâh*” in Persian music and such terms as “*edvâr*”, “*terkîb*”, “*şed*”, “*perde*”, “*âvâze*” and “*şu'be*” in the middle ages of the Ottoman Empire were used from time to time as equivalents of the concept of *maqam* (Özkan, 2003, p.410).

We encounter the term *maqam* firstly in the works of Abd al-Qadir Maraghi on musical theories (Sezikli, 2007, p. 68). Before that usage, Safiyuddin Abdülmü'min Urmevi (d. 1294) used the concepts of *daire*, *devir* and *edvâr* in his epistles titled *Kitâbü'l-Edvâr* and *Şerefiyye* (Uygun, 1999, p.168). When we analyze the manuscripts of Abd al-Qadir Maraghi and his son Abdulaziz, we see that they named *maqam* the most harmonious twelve *daires* out of the ninety one *daires*, which are constituted by joining fifth or fourth intervals together (Koç, 2010, p.51).

Safiyüddin's work *Kitâbü Al-Edvârı* defined twelve *daires*, six *âvâzes* and four *şubes* based on eighteen pitches (*perdes*) and seventeen intervals within an octave. Abd al-Qadir Maraghi defined twelve *daires*, six *âvâzes* and twenty four *şu'bes* based on ninety one *daires*. Although there is an unproductive period in Turkish music theory between the 15th and 17th centuries, The Moldovan Prince Cantemir ended this period with his works in the 17th century. In his work titled *Kitâbü'l-Müsikî alâ Vechi'l-Hurûfat*, he described and classified the variety of *maqams*. In this work, Cantemir defined seven *âvâzes*, twelve *maqams*, four *şu'bes* and twenty seven *terkîbs*. Cantemir analyzed *maqams* in two ways. In the first one, he only gives the description of a *maqam* while in the second one, he elaborates on its properties such as *seyir* (melodic progression), *çeşni* and *geçki* (modulation) (Kantemiroğlu, 2001 (edited by: Yalçın Tura)).

After these works of Cantemir, not much work on *maqam* was conducted in the 18th century until the period of Selim III. In the period of Selim III, Abdalbaki Nasir Dede added another dimension to the concept of *maqam* with his works *Tedkik u Tahkik* (“Examination and Verification”) and *Tahrirîyye*. The *maqams* which were defined by such terms as *maqam*, *şu'be* and *âvâze* until this period came to be described and classified in two ways as *maqams* and *terkîbs* (compounds) (Başer, 2013). In the 20th century, the attempts to systematize the Turkish music theory initiated by such musicologists as Rauf Yekta, Zekâi-zâde Ahmed Irsoy and Ali Rıfat Çağatay began to give results with the Turkish music theory of Hüseyin Saadettin Arel ve Suphi Ezgi. Today, this theoretical system of *maqam* is in use.

1. MAQAM IN TURKISH MUSIC AND THE ELEMENTS OF MAQAM

1.1. MAQAM IN TURKISH MUSIC

Maqams are the patterns of melody which are constituted by certain tunes (*nağme*) and intervals, beginning with certain tetrachords and pentachords, continuing with certain tunes and resolving into suspended cadences at certain pitches (*perdes*) (Tura, 1988, p. 141). On the other hand, *maqam* is the formation style of melodies. The special musical progression which indicates its quality by its arrangement by various rates and intervals is called *maqam*. (Kutluğ, 2000, p. 75). In Arel-Ezgi sound system, *maqam* is defined as the special relation of sounds

between the tonic and strong sounds (Ezgi, 1932, v. 1, p. 48). On the other hand, Abdülkadir Töre defines *maqam* as the structure in which music sentences constituted by a special *seyir* rule and comprised of sounds harmonious with each other at certain intervals within a scale (Karadeniz, 1965, p. 64). Mesud Cemil defines *maqam* as the special character constituted by the melodic move played in compliance with the particular rules and restrictions of a scale (Kutluğ, 2000, p.77). Having summarized the different definitions of *maqam* provided by various musicologists, we may define it as the musical structure which constitute a scale out of a variety of high and low sounds in harmony with each other in compliance with certain rules such as *perde*, *asma karar* (suspended cadence), *karar* (cadence), *seyir* (melodic progression) and *çeşni* (modulation). *Maqams* were classified based on their structure of scales, *perdes* and *seyirs* in accordance with the Arel-Ezgi system. It is classified under three headings. These are the following: 1. Simple, 2. Transposition (Şed, Transposed) and 3. Combined (mürekkep).

Simple *maqams*: Simple *maqams* have one octave interval constituting a scale out of tetrachords and pentachords.

Transposed (Şed) *maqams*: These *maqams* are constituted by the transposition of a simple *maqam* of one octave interval onto another *perde*, leading it to gain different *seyir* properties.

Combined (mürekkep) *maqams*: These are *maqams* which are comprised of full or missing tetrachords and pentachords exceeding an octave or an octave interval and which have different properties in terms of *perde* and *seyir*.

While the concepts of tone and mode in Western music are similar to the concept of *maqam*, they are not capable of conveying the same meaning (Özkan, 2003, p. 412).

1.2. ELEMENTS CONSTITUTING THE MAQAMS IN TURKISH MUSIC

1.2.1. PERDES

Perde is the musical term which has been in use since it was used by Abd al-Qadir Maraghi in the 15th century. It was used as an equivalent of *maqam*, *devir* or *daire* from time to time as well. Basically, these are the tender sounds which determined the intervals constituting the *maqam* reflecting the character of the *maqam* in Turkish music. *Perdes* play an important part in the execution of a certain *maqam*. *Perdes* may be classified in the following way depending on their function: *Karar* (Cadence, the Tonic) *perde*, Strong (1st Degree Suspended Cadence), High-Pitched (High Tonic), *Yeden perde*.

Karar (Cadence, the Tonic): This is the *perde* in which *seyir* and *çeşni* of the *maqam* ends and the melody comes to a halt. This *perde* is called the Tonic (*durak*) as well.

Strong (1st Degree Suspended Cadence): This is the name of the *perde* in which the tetrachord and pentachord of the *maqam* is joined, constituting the frame of the *maqam*. In other words, it is the *perde* of 1st degree suspended cadence. The tonic and strong *perdes* constitute the basis of the *maqam*. The *perdes* in which *çeşnis* (modulation) and *seyir* (melodic progression) are used as *karars* in a *maqam* are called suspended *karars*, half *karars* or temporary *karars* (cadences) (Özkan, 2003, p. 411). Strong *perdes* are the points where tetrachords and pentachords are joined; but this is different in certain *maqams*. For example, in *muhayyer maqam*, there is strong *hüseyni* (e) *perdesi* in theory and *muhayyer* in practice.

High-Pitched Cadence (High-Pitched Tonic): It is the name of the *perde* at the high-pitched point of a tetrachord or pentachord or of an octave in a cadence *perde*. Musicologist Rauf Yekta indicates that high-pitched tonic pitches (*durak perdesi*) are more important in combined *maqams* (Kutluğ, 2000, p.85). High-pitched tonic pitches (*durak perdesi*) are important since they function as bridges for *geçkis* (modulation) at high-pitched points of *mürekkep* (combined) *maqams*.

Yeden: *Yeden perdesi* is the name of the *perde* which gives the feeling that we reach the *karar perdesi* (cadence pitch) before we stop at *karar* or *asma karar* (suspended cadence). Generally, this *perde* is away from the low-pitched part of the *karar perdesi* (cadence pitch) and this distance *bakiyye* or *tanini* interval.

1.2.2. EQUIPMENT

It is the indication of changes in small intervals, which constitute the character of the *maqam* and which are located at the different intervals of the scales of the *maqam* as flat or sharp. They are located just after the treble clef in the stave.

1.2.3. WIDTH

The *maqam* scales have been illustrated with sound intervals of an octave since Safiyüddin Urmevî (d.1294), the founder of the systematizer school. The *maqam* is widened by using the sounds below or above the octave interval depending on the character of the *maqam*. It may be illustrated in a *seyir* besides the character of the *maqam* in the widening of the *maqam*. The low-pitched or high-pitched parts of the *maqam* may be widened as required by the *maqam* or to improve the work in question.

1.2.4. ÇEŞNİ

Çeşni are the small melodic structures which emphasizes the character of the *maqam* (Bozkurt; Ayangil; Holzapfel, 2014, p. 5). It highlights the fundamental characters of the *maqam*. They are also small melodic touches within the scope of a *maqam*. It is the *çeşni* composition which expresses, illustrates and distinguishes the *maqam* (Kutluğ, 2000, p.92). More *çeşni* is used for combined *maqams* due to their structure.

1.2.5. SEYİR (MELODIC PROGRESSION)

It is a travel across different sounds within the scale of a *maqam* in compliance with certain rules in Turkish music (Özkan, 2003, p.411). The concept of *seyir* has an important role in distinguishing *maqams* from each other. The *seyir* of a *maqam* is improvised. The flow of a *seyir* must include the parts of *zemin*, *meyan* and *karar* (cadence). Although *seyirs* may change depending on the character of the *maqam*, they may be grouped as descending, ascending and descending-ascending *seyirs*. In all of these kinds of *seyirs*, the *seyir* must end at *karar perde* (cadence pitch) no matter the *perde* from which the *maqam* begins (Kutluğ, 2000, p.91).

Descending seyir: The *seyir* begins with the sounds around the high-pitched *karar* of the *maqam* and at the end of the *seyir*, we reach the sounds near the *karar* (cadence) and the *maqam* is concluded with the *karar perdesi* (cadence pitch).

Ascending seyir: The *maqam* begins with the sounds around the *karar* (cadence) in the low-pitched part. The high-pitched sounds from the strong *perde* are not much used. The *seyir* is concluded in the *karar perdesi* (cadence pitch) after crossing over the sounds between the *karar* and the strong pitch.

Descending-ascending seyir: In this kind of *seyir*, the *maqam* begins around the strong *perde* in general and both the high-pitched and low-pitched sounds of the *maqam* scale are used intensively.

To give an example to this kind of *seyir*; the *rast maqam*, which has an ascending *seyir*, uses the interval between *rast* and *neva perdesi*. The *mahur maqamı*, which has a descending *seyir*, becomes intense around the *gerdaniye perdesi*, which has a high-pitched *karar perdesi* (cadence pitch) and uses the low-pitched area as it reached the *karar perdesi*. The *bayati maqamı*, which has a descending-ascending *seyir* begins with the strong pitch and uses both the low-pitched and high-pitched area intensively.

The *seyir* is the most important thing determining the character of a *maqam*. Otherwise, it would not be possible to distinguish such *maqams* as *bayati*, *uşşak*; *muhayyer*, *hüseyni*; *neva*, *tahir*; *gülizar*, *karcığar* from each other since they have the same scale.

2. DEVELOPING THE SKILL OF SEYİR (MELODIC PROGRESSION) IN TEACHING TURKISH MAQAM MUSIC

2.1. THE IMPORTANCE OF SEYİR IN TEACHING THE MAQAMS OF TURKISH MUSIC

In Turkish musics, the *maqams* may illustrate their distinctive character mostly based on the *seyir* they make. In this regard, Cinuçen Tanrıkorur claimed that the scale has an effect of 20% while the *seyir* has an effect of 80% in constituting the character of a *maqam* (Karaosmanoğlu, 2010). Each *maqam* has a distinctive *seyir* flow (melodic progression). This is explained in a number of books on musical theory. Preparing the *seyir* based on these books may make it difficult to perceive the essence of the *maqam*. To understand the *seyir* which constitutes the character of the *maqams*, we need to analyze the *maqams* of the periods in question, to investigate the repertoire of the *maqams* in question and practice them. This is important for the musician to learn the *seyir* of the *maqams*.

When we analyze the books on the history of Turkish music, we could see that music lovers gave information about the *seyir* of the *maqams* especially in edvârs and epistles. For example, we encounter the first explanations of *seyir* in “el-Matla”, which is a work of Seydî who lived in the 15th century. For instance, Seydî describes the *seyir* of the *maqam* named *sabâ* as follows: “*Sabâ* is a thing that one plays *nevrûz*, has cadence at *avaz* and continues at the *maqam* of *segah* (Arisoy, 1988, p.47). The musician Cantemir, who lived in the 17th century, says the following about the same *maqam* of *sabâ* in his *edvar*: “The *maqam* of *sabâ* is a nice and pleasant *maqam*. The *perde* of *sabâ* is the half *perde* between the *çargah* and *neva*. In this *maqam*, the musician starts from the *perde* named *dügah*, ascends to *segah* and *çargah*, and stays here for some time and finally stops by the *perde* named *sabâ* in a smooth way. If one descends from the high-pitched sound to the low-pitched one, it will illustrate itself with three *perdes* and is concluded at the *perde* named *dügah*. As I mentioned in *maqam* named *sabâ*, the musician starts from the *perde* of *dügah*, ascends to *segah* and *çargah* and steps on its own *perde* and without complicating it, she goes over the *perde* named *neva* to reach the *perde* of *hüseyni*. After completing it, she may ascend to the high-pitched *perde* which is named *hüseyni*. Then, she may leave this path and she may leap to the *perde* of *neva* from the *perde* of *hüseyni* and step on its own *perde*. After completing it, she has *karar* at the *perde* of *dügah*” (Tura, 1976, p.72). The 18th century musicologist Abdalbaki Nasir Dede talks about the *maqam* of *sabâ* as follows: “In *sabâ*, [the musician] starts from the *perde* of *çargah*, moves to *sabâ* and then to *çargah*, *segah* and *dügah*; she may has *seyir* up to the *hüseyni*, *acem* and *muhayyer* from the *hüseyni* and down to the *perdes* of *dügah* and *rast*. In this *maqam*, there are the *maqams* named *kûçek* and *zirefkend* in the same

scale” (Aksu, 1988, p.162). Haşim Bey, a musician who lived in the 19th century, says the following about the *maqam* of *saba*: “[The musician] starts with the *perdes* of *segah*, *çargah*, *uzzal* and then ascends up to the *perdes* of *acem*, *gerdaniye* and *şehnaz* and having descended to the *perde* of *çargah*, she moves to *segah* and concludes with the *perde* of *dügah*” (Haşim Bey, 1865, p.28)

Following these descriptions of the *seyirs* of *maqams* in the Ottoman Empire, Rauf Yekta was the first person to write them in Western notes in an article that he wrote for Lavignac. In this article, he gave the examples for the *seyir* of thirty waltzes composed of the most common *maqams*. Following Rauf Yekta, examples of *seyir* were given by Muallim İsmail Hakkı Bey in his book titled *Tekamül Dersleri* and by Şefik Gürmeriç in his notes which he prepared for his students in the conservatory (Signell, 1986, p.61-62).

It is not possible to lay out the *maqams* in Turkish music without analyzing *seyirs*. The scales does not suffice to define a *maqam*. *Maqams* such as *uşşak-bayati*, *hüseyini-muhayyer*, *neva-tahir* and *saba-dügah* are distinguished by their *seyir* properties. Without the *seyir*, a scale cannot give a sufficient definition of the *maqam*. Some *maqams* such as *uşşak-bayati*, *hüseyini-muhayyer* use the same scale and can only be distinguished based on their different *seyirs*.

All *maqams* have a particular sound field. For example, the *maqam* of *uşşak* extends to the *perde* of *yegah* at low-pitches and does not ascend above the *perde* of *neva* at high pitches. The *maqam* of *bayati*, which is of the same scale, may ascend to *hüseyini aşiran* at low pitches and ascend beyond the *perde* of *muhayyer* at high pitches. In the *maqam* of *hüseyini*, a *seyir* which includes ascending and descending is possible and the sounds between *muhayyer* and *rast* are used while in *muhayyer*, which is of the same scale, the sounds between *dügah* and the high-pitched *neva* are used. The *maqam* of *neva* involves descend and ascend as well, and moves over the sounds between *dügah* and *muhayyer* while *tahir* illustrates a descending sound and then ascends up to very high-pitches *perdes* till the *perde* of *neva*.

Up to this point, I have explained the importance of *seyir* through examples in consideration of the scales of the *maqams*.

To make *seyir* in consideration of *çeşnis* inside the *maqams* constitutes another dimension of the issues. This issue is encountered generally in the *seyirs* of the combined (*mürekkep*) and transposed (*şed*) *maqams*. Up to this point, the fact that we analyzed *maqams* with simple and plain scale, having no complex structure and *çeşnis* enabled us to illustrate the importance of *seyir* based on *maqams* with simple scales and *perdes*. However, there is another reality: Especially in transposed and combined *maqams*, *çeşnis* and *geçkis* (modulation) constitute the frame of the *maqam*.

If we start our examples regarding the importance of *seyir* with combined *maqams*, we see that the scale of *çargah* is at the same time the scale of *mahur* at the *perde* of *rast* and of the *maqam* named *acemaşiran* at the *perde* of *acemaşiran*. The *maqams* of *çargah*, *acemaşiran* and *mahur* are distinguished by their *çeşni* and *perde*. The *maqam* of the *çargah* has *karar* at the *perde* of *çargah* and has a *seyir* of descend and ascend, which is monotonous and simple. The *maqam* of *mahur* has a *seyir* which is played at high-pitches and has its *karar* with the *perde* of *rast*. It has a bright structure. When we look at the traditional *mahur* works in our repertoire, the small interval of *mücennepe hüseyini mahur* which is to have five commas in theory is played with nearly six commas. *Kürdili* cadences are used on the *perde* of *hüseyini* and cadences with *çargah* are used on the *perde* of *çargah* before the *karar* is concluded by a sudden move to low-pitched sounds. In the *maqam* of *acemaşiran*, the musician begins with high-pitched sounds and reaches the *karar perdesi* (cadence pitch) at the last moment and resolves the melody at the *perde* of *acemaşiran*. The most important aspect of this *maqam* is that it must be audible that the *perde* intervals of *hüseyini-acem* and *muhayyer-sünbüle* are nearly one comma closer to the *bakiye* interval. In addition, the strong *acem* is stressed in this *maqam* a lot and the bridge of *acem-çargah* is played a lot.

When we look at the mathematical intervals between such transposed *maqams* as *uzinak*, *hicazkâr*, *zirgüleli hicaz* and *şedaraban*, we see that their scales are the same. These *maqams* are distinguished by their *seyir*, *çeşni* and *perde*. These *maqams* are of *zirgüleli hicaz* scale in essence. First of all, when we look at the *maqam* of *zirgüleli hicaz*, we see that the *maqam* is like an ordinary *hicaz* and uses *perdes* of *zirgüle* and *simetriği şehnaz*. Its most important property is that the *yeden* of *zirgüle* is stressed and *karar* is made at the *perde* of *dügah*. In the *maqam* of *hicazkâr*, on the other hand, the *maqam* starts at high pitches as descendant and does not digress from the sounds at the scale. Sometimes *geçkis* of *uşşak* may be played at the *perde* of *neva* (see the *hicazkâr saz semâi* of Tanburi Cemil Bey). The most important property of this *maqam* is that as it enters *karar perdesi* (cadence pitch), the *perde* of *nim hicaz* (do#) may be played with glissando. Although *şedaraban* is similar to the *maqam* of *hicazkar* in terms of its structure, it has the *çeşni* of *nihavend* at the *perde* of *rast*. The *karar* of the *maqam* is made with the scale of *zirgüleli hicaz* at *yegah*. Therefore, the *perde* of *nim hicaz* does not be used as is the case with the *maqam* of *hicazkâr*.

When we analyze the *muhayyer-kürdi*, *acem-kürdi* and *kürdi* *maqams* as examples to combined (*mürekkep*) *maqams* with regard to their *seyir* (*progression*), we see that they are completely the same in scale. The *maqam* of *kürdi* progresses at low pitches as an ascending *maqam* and has *karar* at the *perde* of *dügah*. The *maqam* of *muhayyer-kürdi* has two types. In the first type, the *maqam* of *muhayyer* is played firstly and then the *karar* is

concluded after a *çeşni* of *kürdi* while in the second one, only the sounds at the scale of *kürdi* are played. This *maqam* has a descending quality; it progresses at high pitches and uses the low-pitched region only towards *karar*. Its *güçlü* (strong) is not the *perde* of *neva*, but of *muhayyer*. The *acem-kürdi* is of two types as well. The first type progresses at the *maqam* of *acem* and has *çeşni* of *kürdi* at the *karar* while the second one plays the scale of *kürdi* and uses the *perde* of *acem* as its *güçlü* (strong). As is seen, although these three *maqams* are of the same scale, there have little similarity. Therefore, in the performance of *maqams*, teaching of *seyir* (progression) is very important.

To give further examples from the combined *maqams*, we may argue that the *maqam* scales of *saba*, *dügah* and *muhayyer-sünbüle* are the same according to the musical theory of Arel-Ezgi. The scales of these *maqams* use the *perde* of *uşşak* (si comma flat) and the *perde* of *saba* (re four comma flat) as accidental sounds in their equipments. These *maqams* are distinguished by the *çeşnis* and *perdes* found in their *seyirs*. For instance, the *maqam* of *saba* is an ascending *maqam* and progresses at the low-pitches. On the other hand, the *maqam* of *dügah* is played like the *maqam* of *saba* and uses the *çeşni* of *segah* over *dügah* towards *karar* or it concludes with a *çeşni* of *zırgüleli hicaz* at the *perde* of *dügah*. The *maqam* of *muhayyer-sünbüle* progresses like *muhayyer kürdi* and uses the *çeşni* of *saba* over *dügah* and has *karar* over *dügah*. As is seen, these *maqams* are distinguished in performance by their different *seyir* and including different *çeşnis* and *perdes* although they are of the same scale.

Another importance of the *seyir* for the performance of *maqams* in Turkish music is that the fact that with the impact of the Western music, in *maqams* which are similar to major and minor blocks chromatic variations are used with duet or small duet intervals. In addition, the use of arpeggio with the trio and fifth intervals gives the feeling of Western music during the *seyir*. These arrangements illustrate the importance of *seyir*.

Perdes are the fundamental aspect for the *seyir* of *maqams*. In other words, the Turkish music is comprised of *perdes* and proper playing of the *perdes* is as much important as *seyirs*. To give an example, the special *perde* of *hüzzam* which gives the *maqam* of *hüzzam* its name has a sliding sound and it requires glissando in each performance. When this is not played, the special interval in the *maqam* sounds like *hicaz* at the *perde* of *neva* and the sound of the *maqam* can not be properly conveyed. To give another example, in the *maqam* of *saba*, the sound which is known as *hicaz* in theory and is played as four comma re flat is actually *saba* and the spirit of the *maqam* and *seyir* cannot be given without glissando.

Therefore, the performance of the sounds in the *seyir* in accordance with their original version, their spirit and the essence of the *maqam* improves the performance of the *maqam*.

2.2. DEVELOPING THE SKILL OF SEYİR (MELODIC PROGRESSION) IN TEACHING TURKISH MAQAM MUSIC

Up to this point, the structure, the *seyir* and the importance of *maqams* in Turkish music have been examined. Now, we will look into certain points regarding the development of *seyir* skills in teaching *maqams* of Turkish music, which is the actual subject matter of this study.

The student of music must have the following qualities for the development of her *seyir* skills during the training she would receive on *maqams*:

1. Good knowledge of *maqams*
2. Listening to the works of Turkish music from artists who are master of their domain
3. Exercising Turkish musical works
4. Competence of the instructor

1. Good knowledge of *maqams*: Having an advanced level of technical knowledge of *maqams* is one of the most important factors for students to develop their *seyir* skills in Turkish music. Here, the student needs to know about tetrachords and pentachords and scale structures, *güçlü* (strong), *karar*, high-pitched *karar*, *asma karar* (suspended cadence), *yeden* sound, *çeşni*, *geçki* (modulation), *genişleme* (development), special *perde* and ascending-descending qualities so that he/she may illustrate the properties of the *maqam* during the *seyir*. In this regard, the cadences at *perdes* and *geçkis* are of high importance depending on the character of the *maqam*. For example, the *maqam* called *bayati-araban* and the *maqam* called *karcığar* are of the same scale and may be distinguished only based on their *geçki* and cadences at *perde*. In the *maqam* of *karcığar*, the musician needs to play the *perde* of *hisar* with a glissando from a high note (*perde*) of *hisar* towards *hisar*. *Bayati-araban* does not have that property. On the contrary, it is played with a *geçki* of *zırgüleli hicaz* by using the *hicaz* and the *perde* of *nim hicaz* on the *perde* of *neva*. In addition, *bayati-araban* has a descending *seyir* and it is used a *karar* like *uşşak* (by using the *perdes* of *acem* and *hüseyni*). As in the example, having a good knowledge of the *maqam* is the key to begin with a good *seyir*.

2. Listening to the works of Turkish music from artists who are master of their domain: As you know, the Turkish music was not officially taught in conservatories for centuries. It was taught especially in Mevlevi lodges and then in *tekkes* (Sufi lodges) and *Enderûn*, which was the Ottoman educational institution. Therefore,

the education was based on exercise (master-apprentice relationship). The student would listen to the Turkish musical works from their teachers and people who sing them well and this would enable the student to strengthen his/her memory as to the *perde* intonation and to develop his/her *seyir* skills, contributing to his/her skill to play melodies. With the development of voice recording technologies in the 20th century, voice records of teachers and performers coming from age-old traditions could be preserved and this field is still being developed. This has simplified the training of students. For example, students who listen to the records of Tanburî Cemil Bey, Hafız Sami or Münir Nureddin Selçuk will learn the *perdes* of Turkish music very well and will develop their *seyir* skills.

3. Exercising Turkish musical works: This would increase the students' grasp of *perdes* and contribute to their knowledge of melodies, improving their *seyir* skills. The more the students exercise with their teachers, the more they will learn about melodies. If they have weak *perde* intonation and have not exercised with the teacher very much, they cannot develop their *seyir* skills and cannot have a grasp of the *maqam*. The problem of today's students of Turkish music with regard to *maqam seyirs* is that they have little knowledge of melodies. That is the reason why they cannot perform *seyirs*. In addition, duration for performing the *seyir* in a *maqam* is shortened and the student is obliged to do *geçki*. The real skill is being able to play a long *seyir* with melodic sentences which are not similar to each other. Therefore, if students can exercise on many works with the teacher, they may develop their *seyir* skills.

4. Competence of the instructor: The instructor is the most important factor since he/she is the one who will convey the information in music training. The reason is that he/she will raise the students with musical skills who are submitted to his/her with his/her own *usul*. Therefore an instructor, who comes from such an ancient tradition as that of the Turkish music and who has absorbed that culture very well and was raised well, will ensure that his/her students learn the *maqams* well and develop their *seyir* skills. The instructor who will give training for *maqam* and *seyir* in Turkish music needs to have a good grasp of *maqams*, repertoire and *seyir* besides having good competence in singing and playing musical instruments. For example, his/her performance of *perdes* in such difficult *maqams* as *saba* and *hüzzam* and the richness of the melodies he/she could perform in the *seyirs* of such well known *maqams* as *buselik*, *nihavend* and *hicaz* may give an idea about the competence of the instructor.

CONCLUSION

In this study, it has been given that an account of and shared experiences with regard to the ways in which *seyir* skills may be developed while teaching *maqams* of Turkish music. Basically, it was argued in detail and with examples that the students may develop advanced *seyir* skills only if they have an advanced technical knowledge of *maqams*, have listened to Turkish music from successful artists, have a competent teacher and could exercise with their teachers. Even though the Turkish music is known as a *maqam* music, it is also the music of *perdes* which are in relation with each other. Therefore, the students must receive a good musical education so that they have an advanced competence with these *perdes*. The *seyir* and the skill of *seyir* constituted by *perdes* may be developed through a master-apprentice relationship, involving a serious regime of exercising, and listening to music.

References

- Arisoy, Mithat (1988). *Seydi'nin el-Matla' Eseri Üzerine Bir Çalışma*, İstanbul: Unpublished Master's Thesis, Marmara University Institute of Social Sciences
- Başer (Aksu), F. Âdile (1988). *Abdûlbâkî Nâsır Dede ve Tedkik ü Tahkik*, İstanbul: Unpublished Master's Thesis, Marmara University Institute of Social Sciences
- Başer, F. Âdile (2013). *Türk Müsikiğinde Abdûlbâkî Nâsır Dede*, İstanbul: Fatih Üniversitesi Yayınları.
- Bozkurt, Barış&Ayangil, Ruhi&Holzapfel, Andre (2014). Computational Analysis of Turkish Maqam Music: Review of State-of-the-Art and Challenges, *Journal of New Music Research*, İstanbul: Informa Ltd. Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK
- Haşim Bey (1865). *Hâşim Bey Mecmûası*, İstanbul.
- Karaosmanoğlu, M. Kemal (2010). Türk Musikisinde Seyir Belirleme İçin Bir Algoritma, *Türk Musikisinde Seyir Olayı Semineri 8 October 2010*, İstanbul: Yıldız Teknik Üniversitesi, VEKOM.
- Koç, Ferdi (2010). *Abdülaziz B. Abdülkâdir Merâgî Ve "Nekâvetü'l-edvâr" İsimli Eserinin XV. Asır Müsiki Nazariyatındaki Yeri*, Ankara: Unpublished PhD Thesis, Ankara University Institute of Social Sciences
- Kutluğ, Y. Fikret (2000). *Türk Müsikiğinde Makamlar (İnceleme)*, İstanbul: Yapı Kredi Yayınları.
- Özkan, İ. Hakkı (2003). *Makam, İslam Ansiklopedisi*, İstanbul: Türkiye Diyanet Vakfı Yayınları, c. 27.
- Sezikli, Ubeydullah (2007). *Abdülkâdir Merâgî ve Câmîü'l-Elhânı*, İstanbul: Unpublished PhD Thesis, Marmara

University Institute of Social Sciences

Signell, Karl (1986). *Makam: Modal Practice in Turkish Art Music*, Seattle, Washington: Asian Music Publications.

Tura, Yalçın [hazırlayan] (2001). *Kantemiroğlu - Kitabı 'İlmi'l-Musiki 'ala Vechi'l-Hurufat Musikiyi Harflerle Tesbit ve İcra İlminin Kitabı Tıpkıbasım-Çevriyazı –Çeviri*, İstanbul: Yapı Kredi Yayınları, c.1.

Uygun, Mehmet Nuri (1999). *Safıyyüddîn Abdülmü'min Urmevî ve Kitâbü'l-Edvârı*, İstanbul: Kubbealtı Yayınevi.

Development Of Science-Pseudoscience Scale For Elementary Students: Widely Accepted Opinions Scale

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ABSTRACT

Although all kinds of knowledge is valuable, some non-scientific knowledge can cause confusion on students' minds. Science-pseudoscience distinction should be taught in all levels of education to protect especially young age students from this confusion. It is hard to change gained beliefs so giving importance to demarcation from elementary to university levels needs to be noticed. In this study it is aimed to develop a scale for science-pseudoscience distinction for elementary school students. For this purpose data was collected from 717 students who were attending 5th, 6th, 7th and 8th grades. 20 items scale was created by structural equation modeling. Lisrel 8.7 programme was used for analyze. The observed fit indexes were χ^2 /sd 3.21, RMSEA 0.056, RMR 0.0077, SRMR 0.048, GFI 0.93, AGFI 0.9, CFI 0.95, NNFI 0.94. All values were found acceptable according to literature. KR-20 internal consistency coefficient for the test was calculated and found as .836. Therefore according to findings, the scale which was named as "Widely Accepted Opinions Scale" and was developed by this study is a valid and reliable data collection tool for elementary school students.

Key words: Science- pseudoscience distinction, elementary school students, structural equation modeling.

INTRODUCTION

One of the main goals of science education is to have scientifically literate society. Scientific literacy has been defined over a five decades in literature. One of the definitions of the scientific literacy is to have an ability to distinguish science from non-science which is called problem of demarcation and understanding its limitations (Lii, Hand & Prain, 2002). However, Today's society is increasingly exposed to pseudoscientific and paranormal claims. To achieve scientific literacy, teachers should aware of these New Age beliefs (Hobson, 2008).

The majority of individuals viewed science as leading certain truth, objectivity, and includes step by step process doing research. Many students have difficulty understanding of scientific knowledge is tentative, product of human creativity, construct subjectively and socio-culturally. Researchers argued the role of teachers and effects of instruction on students' views of science and non-science (Cobern & Loving, 2002).

Educators aimed to teach not only scientific facts, theories and laws to individuals but also they need to teach value of scientific knowledge, power, validity and limitations of science (Turgut et al., 2010). The nature of science is a dynamic structure, brings ongoing development and change together. The perceptions about science can be differentiated in this process. Scientists don't use a single method in scientific studies because scientific problem solving ways have differences based on the problem (Çetinkaya et al., 2013). A scientific problem solving way has many characteristics like as being logical, has to be based on accurate and reliable observation and experiment.

Lederman and Zeidler (1987) explained nature of science as values and assumptions inherent to the development of scientific knowledge. Questions concerning the nature of science include such as what science is and what distinguishes it from 'pseudoscience'? What is the scientific method? If there is any, how scientific claim can ensure the objectivity of scientific results? How does science explain our observations and experiences? These questions concerning the nature of science need to be discussing in science classrooms for helping students to distinguish science from pseudoscience (Sönmez, 2008).

The disciplines of science which doesn't meet these features together are called pseudoscience. Teaching nature of science is important for solving this distinction (Turgut et al., 2010). Pseudosciences do not value debate and criticism and rarely show intellectual development and genuine progress (Beyerstein, 1995). Students need to be provided with opportunities to apply the scientific method (or hypothetic deductive approach) during science classes. In this process they will likely be asked to suggest one or more hypotheses (i.e., proposed explanations) for an observed phenomenon and test it or them (Eastwell, 2011). It is conscious forward would be possible the recognition of pseudoscientific claims, the separation of wrong and right, to ensure the correct knowledge a more active role in life and to evaluate different knowing forms in their own contexts (Turgut, 2009). Open and reflective discussions are effective on students' awareness (Lederman, 2007). If this distinction is being reached in young ages, students can be grown as individuals who make the separation between science and pseudoscience.

Even after acquiring a conclusion in the face of evidence, people tend to hold on beliefs that they believe (Wynn & Wiggins, 2002). Therefore it is needed to define the distinction between science and pseudoscience to prevent their superstitions get ahead of scientific truths. This distinction issue has been a debated case for scientists and philosophers. Especially in the early 20th century, the philosophy schools that were founded in several countries aimed to put a line between science and pseudoscience (Çetinkaya et al., 2013). This issue can be called as demarcation and there is not a clear distinction. Also this distinction was determined by different ways by scientists. For example Feyerabend discussed that all kinds of knowledge is valuable and necessary for scientific development (Feyerabend, 1999; Wynn & Wiggins, 2002).

When the studies about science-pseudoscience distinction scale are examined, there is a study found about scale adaptation on university level. The study was carried out by Çetinkaya et al. (2013) and it was seen that the adapted scale from Oothoudt (2008) was included three subscales as "science as a process of inquiry", "belief in pseudoscientific beliefs" and "applying the parameters of science to pseudoscience". In another study, Çetinkaya (2012) was designed science-pseudoscience distinction scale for middle school students. This scale was designed entirely by the context. It is quite necessary to give attention to science-pseudoscience distinction in elementary school level for protecting students from non scientific beliefs. Therefore, there is a need for a valid and reliable data collection tool for elementary school students on science-pseudoscience demarcation.

METHOD

This study was designed as a scale development work in order to determine whether the students can make the separation of science-pseudoscience and to establish a valid and reliable data collection tool. The study was conducted with 717 elementary school students who are attending 5th, 6th, 7th and 8th grades. According to Kline (2010), for structural equation modeling analysis it is needed 10 times more sample size of variable amount join to research. Therefore it can be seen that the study's sample size is convenient for the analysis.

A 52-question survey was created for getting the students' opinions on science and scientific studies. There were two choices; "Yes, I believe" and "No, I don't believe". The scoring was 1 for "Yes, I believe" answer and 2 for "No, I don't believe". Confirmatory factor analysis (analyzed by LISREL 8,7 programme) and Kuder Richardson-20 formula was used for data analysis and validity and reliability (Ada et al., 2012).

To develop a reliable and valid instrument five steps were used. These were doing national and international literature review on the subject, developing an item pool based on literature search and the data were collected from 250 elementary students' answers to open-ended questions about the subject, asking expert opinion about the items for content validity and refinement of items after expert opinions, pilot study and refinement of items after pilot study and finally statistically analysis for final version of the instrument.

After doing literature review, the items in the instrument were generated by using W.W. Cobern (2000)'s "The Thinking About Science Survey Instrument (TSSI)", and P.F.W. Preece and J. H. Baxter (2000)'s paper called "Skepticism and gullibility: the superstitious and pseudo-scientific beliefs of secondary school students". In addition 250 elementary students were asked to answer open-ended questions about science-pseudoscience distinction.

The goodness-of-fit tests about data-model correlation can be handled at the same time as a valid indicator of the model parameters (Aşkar & Yurdugül, 2009). The most common statistics that are using for model-data fit calculation by taking advantage of the confirmatory factor analysis are the chi-square (χ^2), χ^2 / sd and RMSEA. In this study first of all, it was analyzed by chi-square ratio between the degrees of freedom. This rate is expected to be up to 3-4. Being smaller than 5 of calculated χ^2 / df ratio and RMSEA's decrease value from 0.055 indicate

model-data compliance (Jöreskog & Sorbom, 1993). The other criteria are RMSEA (Root Mean Square of Approximation), GFI (Goodness of fit index), AGFI (Adjusted goodness of fit), CFI (Comparative fit index), IFI (Incremental fit index) and standardized RMR (SRMR/ The square root of the average standardized error). It is acceptable that RMSEA and SMRS should be below than 0.08 or even below 0.05 are considered more as a good compatibility index. It is expected that CFI, GFI and AGFI values are ≥ 0.90 (Şimşek, 2007). Also Sümer (2000) points out GFI and AGFI from the absolute fit index value 0.95 and higher mean very good fit, between 0.90-0.95 mean the satisfactory compliance. Similar, when the incremental fit indexes CFI and NNFI are 0.95, it is a very good fit, and when they are between 0.90-0.95, it is acceptable fit (Olpak & Kılıç Çakmak, 2009).

FINDINGS

Validity

First, 52 questions had been created for scale development process. Survey questions were decreased from 52 to 46 by expert opinions. After the pilot study, it was decided to use 31 of these questions. By the way overall the questions were mostly turned to “opinions which are widely accepted” more than science-pseudoscience distinction. More total grade that students get from the scale means the student have less superstition; less grade means more superstition. The items which were created according “Widely Accepted Opinions Scale” were assumed in one factor and confirmatory factor analysis was started depending on one factor (Kline, 2010; Şahin & Gizir, 2013). First, all 31 questions were analyzed and the fit indexes are shown in Table 1.

Table 1: The Fit Indexes of 31 questions after eliminating from 46 questions

Fit indexes	χ^2/sd	RMSEA	RMR	SRMR	GFI	AGFI	CFI	NNFI
Observed	3.69	0.061	0.011	0.058	0.87	0.86	0.90	0.89
Limit	≤ 5	≤ 0.08	≤ 0.10	≤ 0.10	≥ 0.85	≥ 0.80	≥ 0.80	≥ 0.80

After getting the fit indexes, standardized Lambda (λ), t and R^2 values were investigated. According to confirmatory factor analysis results, for item elimination factor load values (lambda) were searched by 0.30 and upper values. The standardized values were examined previously in the diagram. Şimşek (2007) emphasize that for t value there shouldn't be any red arrows because red arrow means the item is not statistical meaningful on 0.05 level. High multi-frame correlation (R^2) which can be used as the validity index is also need to have value ≥ 0.30 . These items were priorly preferred according to Kline (2010).

Table 2: Standardized Lambda (λ), t and R^2 Values

First Items	Lambda	t	R^2	First Items	Lambda	t	R^2
1	0.29	7.45	0.91	32	0.45	11.77	0.80
2	0.30	7.58	0.91	33	0.59	16.26	0.65
15	0.08	1.91	0.99	34	0.41	10.67	0.83
16	0.01	0.26	1.00	35	0.49	13.00	0.76
20	0.26	6.58	0.93	36	0.29	7.26	0.92
21	0.22	5.61	0.95	37	0.44	11.52	0.81
22	0.32	8.17	0.90	38	0.40	10.37	0.84
23	0.16	4.09	0.97	39	0.53	14.21	0.72
24	0.39	10.21	0.85	40	0.49	12.98	0.76
25	0.27	6.88	0.93	41	0.10	10.28	0.84
26	0.31	7.94	0.90	42	0.47	12.43	0.78
27	0.22	5.58	0.95	43	0.57	15.45	0.68
28	0.33	8.32	0.89	44	0.52	14.08	0.73
29	0.55	14.94	0.70	45	0.46	12.26	0.78
30	0.51	13.65	0.74	46	0.52	7.78	0.91
31	0.49	12.90	0.76				

As seen from Table 2; the items 1, 2, 15, 16, 20, 21, 23, 25, 27, 36 and 41 from 31 questions were removed because of low factor load values. Also, 15th and 16th items were removed because of not being statistically meaningful (red arrows) on 0.05 level. By the way 11 questions were eliminated and 20 questions were analyzed again. The new questions' fit indexes can be seen from Table 3.

Table 3: The Fit Indexes of the last 20 questions

Fit indexes	χ^2 / sd	RMSEA	RMR	SRMR	GFI	AGFI	CFI	NNFI
Observed	3.21	0.056	0.0077	0.048	0.93	0.91	0.95	0.94
Limit	≤ 5	≤ 0.08	≤ 0.10	≤ 0.10	≥ 0.85	≥ 0.80	≥ 0.80	≥ 0.80

As seen from Table 3, the new model's fit indexes according to structural equation modeling were χ^2 / sd 3.21, RMSEA 0.056, RMR 0.0077, SRMR 0.048, GFI 0.93, AGFI 0.9, CFI 0.95, NNFI 0.94. It can be said that one factor depending scale model's fit indexes are acceptable. The 20 questions model's path diagram can be seen from Figure 1.

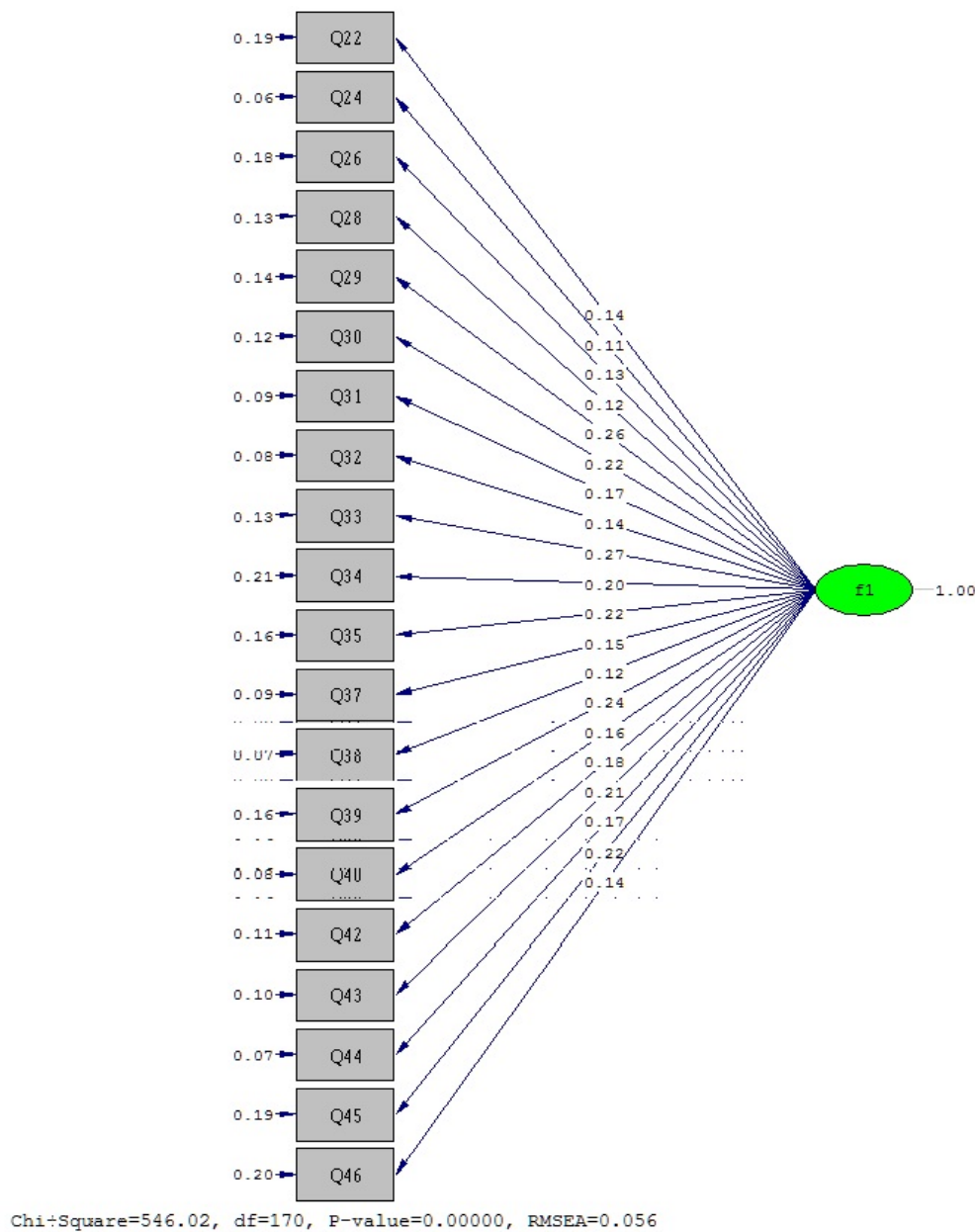


Figure 1: Path Diagram of the Model

Reliability

In this study, because of working with a nominal scale (there were two choices for the answer of the questions), the KR-20 internal consistency coefficient for the test was calculated. Reliability factor was found as .836. This finding shows that the scale is a reliable measurement tool for elementary school students.

CONCLUSIONS

In this study according to findings, a “Widely Accepted Opinions Scale” was developed. The scale has one factor and 20 questions that aimed to figure out elementary school students’ superstitions. The amount of questions was decreased by expert opinions and pilot study. There are two answers of the questions. The students get 1 point for “Yes, I believe” answer and 2 point for “No, I don’t believe” answer. The lower grade is 20; the highest grade is 40 that can be taken from the scale. There are no reverse items. The lower score means student has high superstitions, the higher score means student has low superstitions. These scores also can give an idea about students’ science- pseudoscience distinctions. Having superstitions can be correlated with demarcation. Students may not make science- pseudoscience distinction if they get lower grade from the scale because of having more superstitions. The scale was analyzed by confirmatory factor analysis and the model showed acceptable fit indexes. The indexes are χ^2/df 3.21, RMSEA 0.056, RMR 0.0077, SRMR 0.048, GFI 0.93, AGFI 0.9, CFI 0.95, NNFI 0.94. At the end of the study KR-20 was found as .836. As a result, it can be seen that the researchers who aim to determine elementary school students’ science-pseudoscience distinction can use this scale as a valid and reliable measurement tool.

References

- Ada, E. N. D., Aşçı, F. H., Çetinkalp, F. Z. K., & Altıparmak, M. E. (2012). Durumsal GÜDÜLENME Ölçeği’nin (DGÖ) beden eğitimi ders ortamı için geçerlik ve güvenirliği. *Ankara Üniversitesi Spor Bilimleri Fakültesi Spormetre Dergisi*, 10 (1), 7-12.
- Aşkar, P. & Yurdugül, H. (2009). Örtük büyüme modellerinin eğitim araştırmalarında kullanımı. *İlköğretim Online*, 8 (2), 534-555.
- Beyerstein, B. L. (1995). *Distinguishing science from pseudoscience*. Victoria, B.C.: The Centre for, Curriculum and Professional Development.
- Çetinkaya, E. (2012). *Bilim-sözde bilim ayrımı tartışmasının ortaokul 8. sınıf öğrencilerinin bilimsellik algıları ve akademik bilgi düzeylerine etkisi*. Yayımlanmamış yüksek lisans tezi, Marmara Üniversitesi, İstanbul.
- Çetinkaya, E., Şimşek, C., & Çalışkan, H. (2013). Bilim ve sözde bilim ayrımı için bir ölçek uyarlama çalışması. *Trakya Üniversitesi Eğitim Fakültesi Dergisi*, 3(2), 31-43.
- Cobern, W. W. (2000). The Thinking about Science Survey Instrument (TSSI) – SLCS 151. Kalamazoo, MI: Scientific Literacy and Cultural Studies Project (<http://www.wmich.edu/slcsp/slcsp151/tssi-v2.pdf>).
- Cobern, W.W. & Loving, C.C. (2002). Investigation of preservice elementary teachers' thinking about science. *Journal of Research in Science Teaching*, 39(10), 1016-1031.
- Lii, C., Hand, B., & Prain, V. (2002). Assessing explicit and tacit conceptions of the nature of science among preservice elementary teachers. *International Journal of Science Education*, 24(8), 785-802.
- Jöreskog, K., & Sörbom, D. (1993). LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language. Chicago, IL: Scientific Software International Inc.
- Eastwell, P. (2011). Supernatural explanations: Science or not? *Science Education Review*, 10 (1), 17-26.
- Feyerabend, P. (1999). *Yönteme karşı*. (Çev. Başer, E.). İstanbul: Ayrıntı Yayınları. (Özgün eser basım tarihi, 1975).
- Hobson, A. (2008). The surprising effectiveness of college scientific literacy courses. *The Physics Teacher*, 46, 404-406.
- Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd Ed.). New York: Guilford Press.
- Lederman, N. G. (2007). Nature of science: past, present, and future. In S.K. Abell & N.G. Lederman (eds), *Handbook of Research on Science Education*. Mahwah, NJ: Lawrence Erlbaum Associates, pp. 831-880.
- Lederman, N. G., & Zeidler, D. L. (1987). Science teachers’ conceptions of the nature of science: Do they really influence teacher behavior? *Science Education*, 71(5), 721– 734.
- Olpak, Y. Z., & Kılıç-Çakmak, E. (2009). E-Öğrenme ortamları için sosyal bulunuşluk ölçeğinin uyarlama çalışması. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 3(1), 142-160.

- Preece, P. F. W., & Baxter, J. H. (2000). Scepticism and gullibility: The superstitious and pseudo-scientific beliefs of secondary school. *International Journal of Science Education*, 22(11), 1147-1156.
- Sönmez, V. (2008). *Bilim felsefesi*. Ankara: Anı Yayıncılık.
- Sümer, N. (2000). Yapısal eşitlik modelleri: Temel kavramlar ve örnek uygulamalar. *Türk Psikoloji Yazıları*, 3(6), 49-74.
- Şahin, E. E., & Gizir, C. A. (2013). Kişilerarası yetkinlik ölçeği- kısa formu: geçerlik ve güvenirlik çalışmaları. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 9(3), 144-153.
- Şimşek Ö. F. (2007). *Yapısal eşitlik modellemesine giriş temel ilkeler ve LISREL uygulamaları*. Ankara: Ekinoks.
- Turgut, H. (2009). Fen ve teknoloji öğretmen adaylarının bilimsel sözde-bilimsel ayırımına yönelik algıları. *Eğitim ve Bilim*, 34, 154, 50-68.
- Turgut, H., Akçay, H. & İrez, S. (2010). Bilim sözde-bilim ayrımı tartışmasının öğretmen adaylarının bilimin doğası inanışlarına etkisi. *Kuram ve Uygulamada Eğitim Bilimleri*, 10 (4), 2621-2663.
- Wynn, C. M. & Wiggins, A. W. (2002). *Yanlış yönde kuantum sıçramalar*. (Çev. Kence, A.). Ankara: TÜBİTAK

Yaygın Olarak Kabul Edilen Görüşler Ölçeği

Eski no	Yeni no	Yaygın Görüşler	Evet İnanıyorum	Hayır İnanmıyorum
22	1	Bazı taşlardan yapılan takıları takmak, sağlıklı olmanızı sağlar. Örneğin Zümrüt taşı sindirim sistemini düzenler.	q	q
24	2	Bir ipin ucuna metal bir cisim bağlayıp el üzerinde sallayarak ileride olacak çocukların cinsiyeti belirlenir.	q	q
26	3	Geçmiş yıllarda, başka gezegenlerden uzaylılar dünyaya gelmiştir.	q	q
28	4	Hava karadıktan sonra dışarıya sıcak su dökmek uğursuzluk getirir.	q	q
29	5	Üzerine kuş pislerse, şansın açık olur.	q	q
30	6	Tahtaya vurmak uğursuzluğu önler.	q	q
31	7	'Y' harfi şeklindeki ağaç çubuklar iki ucundan tutulursa, hazineye yaklaştıkça ağaç çatal titremeye ve aşağıya, hazinenin bulunduğu yere doğru dönmeye başlar.	q	q
32	8	Merdiven altından geçmek uğursuzluk getirir.	q	q
33	9	Kara kedi görmek uğursuzluktur.	q	q
34	10	Mavi renkli nazar boncukları insanları nazardan korur.	q	q
35	11	Kurşun dökmek nazara karşı korur.	q	q
37	12	Avucunuzdaki çizgilerden gelecekte başınıza neler geleceğini tahmin etmek mümkündür.	q	q
38	13	Kızlar kapı eşiğinde oturursa çocukları olmaz.	q	q
39	14	Sağ el kaşınması, para geleceğine işarettir.	q	q
40	15	Sarımsakları evin duvarına asmak evi uğursuzluklardan korur.	q	q
42	16	13 uğursuz bir sayıdır.	q	q
43	17	Ayna kırmak uğursuzluk getirir	q	q
44	18	At nalını kapı üstüne takmak uğur getirir	q	q
45	19	Köpeğin gece havlaması kötü şeylere işarettir.	q	q
46	20	Gece tırnak kesmek günahahtır.	q	q

Discovery Year Management: The Four Years Experience

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ABSTRACT

Our university was first established in 1985. One of its main goals then is to produce local workforce for the nation. Fast-forward 30 years later, the university has evolved to become a research-intensive university with internationalisation at the forefront of its strategic thrust. The transformational journey was timely in order to cater to the ever-changing needs of local and international society and the global market, and to respond to the rapidly changing expectations of higher education. This paper looks at how we evolved on the internationalisation front focusing particularly on outward student mobility. On the outbound front, our innovative curriculum, known as GenNEXT, allows students to leave the university for one year in their third year of studies also known as the discovery year. Various supports and services have been put ranging from academic, financial to welfare support in order to facilitate this outbound mobility.

Keywords: Student mobility, Support and services, Internationalisation

INTRODUCTION

This paper is divided into three parts. The first part focuses on the brief history of Universiti Brunei Darussalam, henceforth referred to in this paper as UBD (UBD, 2013a), its journey of transformation ranging from total overhaul of the curriculum to its internationalisation initiatives. The second part focuses on our innovative curriculum and its mandatory year out also known as the ‘Discovery Year’ (UBD, 2013b). We discuss the benefits of discovery year to our students as well as the type of supports and services available to our students. These supports come in many forms ranging from academic and administrative supports to financial support. Finally, we share the challenges and issues faced by UBD and how we can overcome it.

JOURNEY OF TRANSFORMATION

UBD was first established in 1985 to cater for the growing demand to produce local workforce for the nation. The first intake of UBD was 176 students. Its curriculum is very major-centric where students would take almost all their modules in their major areas. Outbound mobility was limited only to the best students in each department. On average, outbound student ratio was 1-2%.

In 2009, the university underwent major transformation. Its curriculum was changed to liberal-arts style broad-based curriculum whereby students only spend 50-55% of their modules in their major areas. The remaining 40-45% of the modules have to be taken from outside their major areas, either within their faculty or outside their faculty thus promoting cross- and trans-disciplinary experiences. More importantly, departments were closed down in place of programmes to promote cross- and trans-disciplinary researches. Interestingly, the new four-year curriculum known as GenNEXT (UBD, 2013c) forces the students to leave the university during their third year of study (also known as the ‘Discovery Year’). During the discovery year, UBD students have a choice of four activities, namely study abroad, internship, incubation and community outreach programme. During study abroad, our students enroll in partner or non-partner universities and take regular courses or modules from these universities on a credit/grade-bearing basis. Internship involves our students working in local companies, government agencies to multi-national companies both locally and abroad. One of the main purpose of internship is to provide our students real-life working experience and at the same time testing their knowledge in a real working environment. Incubation project is basically working on starts-up, which could originate from business or technological ideas or innovations. For the community outreach programme, our students indulge in giving back to the society through various activities such as teaching English, building ‘hut’ library and so on.

UBD has also identified internationalisation (Bartell, 2003; Stromquist, 2007) as its key strategic initiatives. This effort ranges from internationalising its curricula, finding more strategic collaborative partners to having joint master degree and increasing international student population. Instilling international mindset in our student is also a major internationalisation effort. All these evolutions were timely, as we needed to develop and improve in scale, scope and reputation, and in borrowing the words of Christensen and Eyring (2011), we were and are still committed to changing the DNA of our institution from the inside out.

SUPPORT AND SERVICES FOR OUTBOUND MOBILITY

A good reliable measure of a world-class university lies in the mobility of students (both inbound and outbound). More importantly, the weightage of student mobility in determining university ranking is 7.5% and 5% for the QS Ranking (QS Quacquarelli Symonds Limited, 2014) and the Times Higher Education Ranking (THES) (TES Global Ltd., 2015) respectively. From a student perspective, doing a stint overseas has numerous benefits. Some of the benefits are:

- It increases self-confidence and thus increasing employability of students.
- It forces the students to be independent.
- Appreciation of other cultures and religions.
- Picking up a new language.

According to Finardi and Rojo (2015), “If an institution wishes to become a centre of international excellence, it needs both to attract students and researchers from around the world encouraging student mobility” (p. 20). From the university perspective, student mobility is important as it raises the international profile and the visibility of a university. It is often employed as an effective marketing strategy to recruit more international students. As mentioned earlier, although outbound mobility has always been in place in UBD, it was implemented at a smaller scale. In addition, overseas university partners that waive tuition fees were rather limited as the notion of student mobility was at its infancy stages.

UBD recognised the importance of student mobility particularly in improving our students’ soft skills and in building global citizen (Alfred & Guo, 2012). This is very important in today’s increasingly competitive and globalised world. Thus, UBD is committed to giving its students international exposure to ensure our students do not miss out. UBD offers supports in many forms ranging from academic advices, finding placements in partner universities to funding. Unlike before, varying degree of funding is available for most students. Top performing students continue to get full funding. This covers airfares, stipends and tuition fees should they choose to enroll in a non-partner university. For the remaining students, stipends will be provided. These students which comprise 60-70% of the entire third year cohort normally enroll in partner universities.

During the inception of the discovery year, 57% of our students left the country for their stint abroad, in comparison to the current data of about 75-80%. These were made possible through UBD’s large and extensive network of bilateral and multilateral partnership, which now spans six continents and over 110 partners as well as membership in important consortia. In a relatively short span, UBD has been able to acquire many international collaborators. UBD’s dynamic leadership also plays an important role. Our ability to leverage on our research expertise in niche areas and political stability are just some of the major components to the success. Located in the middle of the Borneo Island, which is mega hot spot for bio-diversity, UBD has been successful in attracting prominent researchers in that area which resulted in more strategic partnerships and formation of key research consortia. These collaborations are vital to us as we strive to maintain higher quality and higher standard of research and talent on a global scale (Sarker, Davis & Tiropanis, 2010; Barber, Donnelly & Rizvi, 2013).

Support for outbound mobility comes at three levels, which are faculty, administrative and university levels. At the faculty level, there is a discovery year coordinator whose main duty is to ensure students take the right modules in partner universities and acquire enough credits amongst others. The discovery year coordinator in consultation with his/her respective deputy dean also provide advices to students to ensure he/she generally make the right university choices.

At the university level, the Global Relations office is responsible for ensuring quotas are available at respective Partner universities and any deadlines are met. In fact, the Global Relations office is responsible for all correspondences with partner universities. In addition, Global Relations is also tasked with finding new and potential partners for student mobility. Another important role played by the Global Relations office is to facilitate the negotiation of MOUs and the student exchange agreements that will pave the way for more student mobility.

Administratively, the Discovery Year Unit (DYU) looks after the welfare and the funding support of the students. Amongst its key role is to provide proof of funding letters, letters to expedite visa application and so on. DYU is also tasked with liaising with our embassies/missions overseas in order to oversee the welfare of our students abroad.

Annually, our outbound mobility spans 6 continents and over 70 universities (refer to Figures 1 & 2). Students do a range of activities from studying abroad in partner universities in Korea, Japan, UK, USA and other Asian and European universities to internship in multi-national companies overseas (Bukaliya, 2012), and substantive community outreach programme in the Philippines, Vietnam, Thailand and Indonesia. Some notable community outreach projects undertaken include teaching English to students in remote villages, instilling entrepreneurship (European Commission, 2008), spirit and mindset in students and so forth.

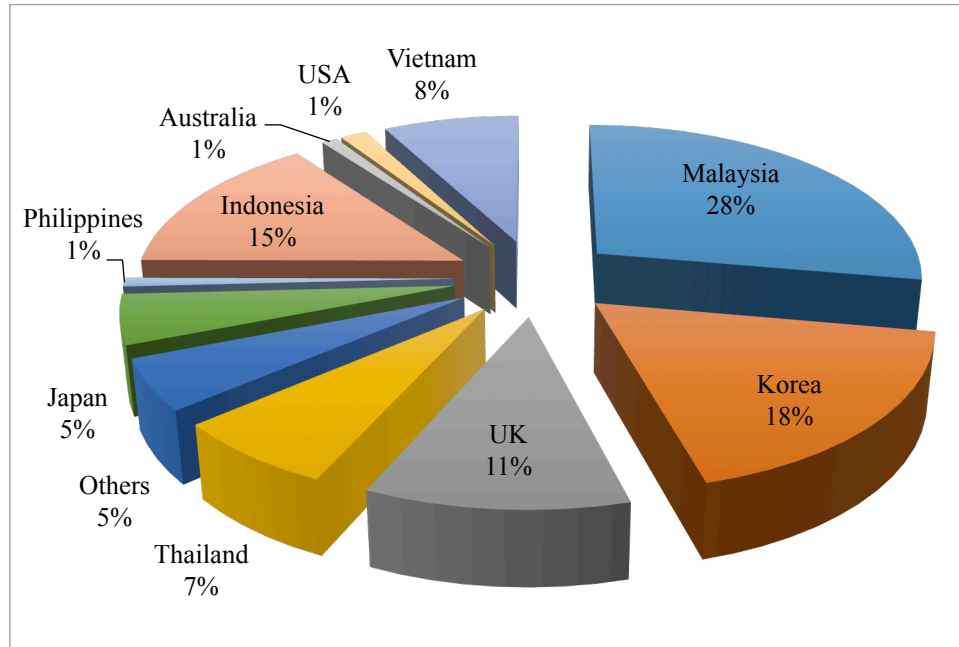


Figure 1: The breakdown of discovery year destinations by nations over the last 4 years

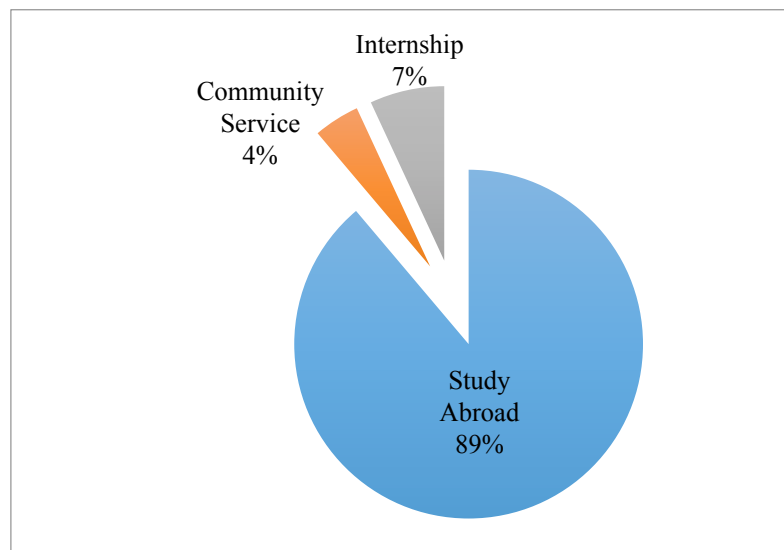


Figure 2: The breakdown of discovery year overseas activities over the last 4 years

So far the outcome of our outbound mobility activities has been very encouraging. And importantly, this was proudly reflected in the recently released results of the QS Asian University Rankings for 2015 where UBD was ranked the top university in Asia for student mobility (Kassim, 2015; QS Quacquarelli Symonds Limited, 2015a; UBD, 2015a, 2015b). According to the survey indices provided by QS, UBD ranked number one for outbound student exchange and a number two rank for inbound exchange (QS Quacquarelli Symonds Limited, 2015b).

Accordingly our UBD outbound students get a first-hand feel of life outside their home country and simultaneously, are being pushed out of their comfort zone. Very importantly, they get a more international

outlook on life that is critical in today's increasingly globalised world. Below are some testimonials from our students.

"Our internships at Karolinska Institutet were amazing. The internship for us was an opportunity to see the theory that we have learnt everyday came to life."

"The journey going to and being in Galapagos was one chapter of our life that will never escape our memory...it has opened my eyes and will help me in my future career where I could apply my knowledge on marine life in Brunei"

One crucial issue we want to address here is, does doing a stint overseas improve the marketability and employability of our students? Initial studies seemed to support our claims. More than 80% are employed within the first three months. The companies they intern in employed some of our students. In fact, most students are employed by the private sectors, which was not typically the case before. Very encouragingly, more and more students are self-employed. Some set-up their own companies whilst others are involved in their own start-ups.

To conclude, there seems to be a big shift in mindset from being over-reliant in government jobs to being more open to other forms and modes of employment. This is important in helping us realise our national vision, to be a knowledge-based economy (Brunei Economic Development Board, n.d.) from one that is resource-based by 2035.

BARRIERS AND CHALLENGES

Although the numbers for outbound have increased significantly, there were many obstacles or barriers faced. For outbound, the greatest challenge is the transfer of credits or grades from the host to home university. This challenge arises due to the differences in interpretation of contact hours within the modules or courses offered. Other challenges we encountered include, an incompatible academic calendar, and the high cost of living particularly for those doing student exchange in developed cities. Other factors include course mapping, lack of courses taught in English, lack of English proficiency and so on. Difficulty in obtaining visa is still a major obstacle particularly for students opting to do overseas internship. Thus, on our part, we utilise heavily on the ASEAN Credit Transfer System (ACTS), European Credit Transfer System (ECTS) to address these credit transfer issues.

Despite the obstacles faced, UBD managed to send out 57% of its student population during the inception of the discovery year in 2011. The ratio has increased from 70% in 2012, 73% in 2013, and 80% in 2014. As mentioned previously, this increase can be partially attributed to the increase in recognition of UBD as not only a solid teaching university but also an up-and-coming research-intensive university. More notably, the latter attribute has allowed us to amass more quality partners thereby increasing both outbound and student mobility. Despite the significant increase in outbound ratio, UBD's spending on funding outbound students has not increased. This is mainly due to partner universities waiving tuition fees for our students. In recent years, an increasing number of our best students have been granted prestigious scholarships by other countries, such as the Temasek Scholarship offered by the Singapore Government and the Global Korea Scholarship.

CONCLUSION

Student mobility is and will always remain important for UBD. We are continuously striving to provide the best support and services for both our outbound and inbound students. Further in-depth studies will need to be conducted on our outbound students, for example, their discovery year preferences even before entering the second year of candidature. For outbound on the other hand, future efforts include utilising the student barometer. This barometer measures students' feedbacks, expectations and experiences during their stay in the Local and Host University. The result of such exercise will enable UBD to identify weaknesses and thus enables the university to make more informed decisions on how to improve students' experience as well as meet students' expectations.

Another future initiative is the summer undergraduate research programme. Local and international student will get the chance to work with top professors and scientists in the university for periods ranging from few weeks to few months on a very specific research area. One of the main objectives of this programme is to cultivate research interests amongst the local and international students at the undergraduate level.

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References

- Alfred, M. V., & Guo, S. (2012). Toward global citizenship: Internationalisation of adult education in Canada and the USA. *The Canadian Journal for the Study of Adult Education*, 24, 51-70.
- Barber, M., Donnelly, K., & Rizvi, S. (2013). *An avalanche is coming: Higher education and the revolution ahead*. Institute for Public Policy Research, London, UK. Retrieved from: <http://www.ippr.org/publication/55/10432/an-avalanche-is-coming-higher-education-and-the-revolution-ahead>
- Bartell, M. (2003). *Internationalization of universities: A university culture-based framework*. *Higher Education*, 45(1), 43-70.
- Brunei Economic Development Board. (n.d.). Brunei's national vision. Retrieved from http://www.bedb.com.bn/why_wawasan2035.html
- Bukaliya, R. (2012). The potential benefits and challenges of internship programmes in an ODL institution: A case for the Zimbabwe Open University. *International Journal on New Trends in Education and their Implications*, 3(1), 118-133.
- Christensen, C. M., & Eyring, H. J. (2011). *The innovative university: Changing the DNA of higher education from the inside out*. San Francisco, CA: John Wiley & Sons.
- European Commission. (2008). Entrepreneurship in higher education, especially within non-business studies: Final report of the expert group. Retrieved from http://ec.europa.eu/enterprise/policies/sme/files/support_measures/training_education/entr_highed_en.pdf
- Finardi, K. R., & Rojo, R. A. O. (2015). Globalization, internationalization and education: What is the connection? *International E-Journal of Advances in Education*, 1(1), 18-25.
- Kassim, A. Z. (2015, June 11). UBD: Asia's best in student mobility. *The Brunei Times*. Retrieved from <http://www.bt.com.bn/frontpage-news-national/2015/06/11/ubd-asia's-best-student-mobility>
- QS Quacquarelli Symonds Limited. (2014). QS university rankings: Asia – methodology. Retrieved from <http://www.topuniversities.com/university-rankings-articles/asian-university-rankings/qs-university-rankings-asiamethodology?page=0>
- QS Quacquarelli Symonds Limited. (2015a). The top 250 universities in Asia. Retrieved from http://www.iu.qs.com/wp-content/uploads/woocommerce_uploads/2015/06/QS-University-Rankings-Asia-2015-Web.pdf
- QS Quacquarelli Symonds Limited. (2015b). Universiti Brunei Darussalam (UBD) rankings. Retrieved from <http://www.topuniversities.com/node/137841/ranking-details/asian-university-rankings/2015>
- Sarker, F., Davis, H., & Tiropanis, T. (2010). A review of higher education challenges and data infrastructure responses. International Conference for Education Research and Innovation (ICERI2010), Madrid, Spain.
- Stromquist, N. P. (2007). Internationalization as a response to globalization: Radical shifts in university environments. *Higher Education*, 53(1), 81-105.
- TES Global Ltd. (2015). World reputation rankings 2015 methodology. Retrieved from <http://www.timeshighereducation.co.uk/world-university-rankings/2015/reputation-ranking/methodology>
- Universiti Brunei Darussalam, UBD. (2013a). About the university. Retrieved from <http://www.ubd.edu.bn/about/about-the-university/>
- Universiti Brunei Darussalam, UBD. (2013b). Discovery year. Retrieved from <http://www.ubd.edu.bn/study-ubd/undergraduate-study/discovery-year-undergraduate>
- Universiti Brunei Darussalam, UBD. (2013c). GenNEXT programme. Retrieved from <http://www.ubd.edu.bn/study-ubd/gennext-programme/>
- Universiti Brunei Darussalam, UBD. (2015a). UBD top in Asia for student mobility. Retrieved from <http://www.ubd.edu.bn/news-and-events/highlights-archive/2015/june/ubd-top-in-asia-for-student-mobility/>
- Universiti Brunei Darussalam, UBD. (2015b). UBD fastest rising university in Asia. Retrieved from <http://www.ubd.edu.bn/news-and-events/highlights-archive/2015/june/ubd-fastest-rising-university-in-asia/>

Discussing Sustainable Urban Development Within Architectural Education

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ABSTRACT

The concepts of “sustainability” and “sustainable urban development” have been at the top stages in the world agenda since 1990s. Architecture as a discipline is strictly concerned with urban development in the globalization process, thus sustainability is a crucial issue throughout architectural education. Being conscious about the priority of these facts the authors discuss the importance of these concepts and the ways of achieving sustainable urban development in the architectural studios they supervise. This paper presents the aim and scope of these studios together with the sample projects developed by undergraduate students of architecture in Uludag University, Bursa/Turkey.

Keywords: sustainability, architectural education, design studio, traditional environment

INTRODUCTION

“Sustainable Development” has become most popularly understood from its definition in the report by Brundtland Commission as “*development, which meets the needs of the present without compromising the ability of future generations to meet their own needs and aspirations,*” (WCED, 1987). In the 20th UIA Congress in Beijing, some alternative approaches have been proposed instead of this minimalist, consensus definition, which proposes sustainability as; “*a local, informed, participatory, balance-seeking process, operating within an equitable ecological region, exporting no problems beyond its territory or into the future*”. After the UIA Congress, sustainability defined as; “*a dynamic process which enables all people to realize their potential, and to improve their quality of life, in ways which simultaneously protect and enhance the Earth’s life support systems*” in the report of the Forum for the Future Annual 2000. As it is understood from the definitions of ‘sustainability’ and ‘sustainable urban development’ these concepts are closely related to the concept of “human development” which is defined as “a process of enlarging people’s choices” and which have the goals of “leading a long and healthy life, acquiring knowledge and having access to resources needed for a decent standard of living”. Today, the authorities have come to recognize the importance of participatory and integrated approach to the incremental implementation of sustainability. Also, all the parties have found that, it is necessary not to take it only in environmental, but also in social, economic, psychological and cultural terms, and their interrelations.

The real question, which is discussed in the scope of this paper via students’ proposals, is; *how societies can shape their modes of change in such a way so as to ensure the preconditions of development for future generations and the concept of sustainability?*¹ As Becker et.al.,(1999), indicate the main objective is to renegotiate the goals of future societal development and to establish a system of governance that is able to implement policies moving towards sustainability on international, regional, national, local levels. Architecture is a discipline that combines the physical, socio-cultural and economic compounds of sustainability in each of these levels in order to design and develop spaces that offers high quality of life to people. In the last decades the question of *How should a good architecture be?* takes place in different architectural debate platforms including academia.

Rogers (2011) indicates; “Good architecture has always been partly about change, but it is also about continuity. With hindsight, the architecture of the past always looks appropriate and doesn’t challenge the viewer, but then the past is safe because we are no longer engaged with its particular artistic, social or technological problems even if at the time it was regarded as cutting edge. Returning to cities, the compact, well-connected city encourages a good social mix, walking, cycling and use of public transport. It is the only environmentally sustainable form of urban building. Suburbs use around three times as much energy as compact cities so we need to ‘re-fit’ the suburbs and this starts by building more compact town centers.” Keitsch (2012) indicates, the main criteria of sustainable architecture can be determined as; minimizing the negative environmental impact of buildings by enhancing efficiency and moderating the use of materials, energy and development space,

¹ This is asked by Becker,et.al., 1999. From their point of view, sustainability refers to the viability of socially shaped relationships between society and nature over long periods of time.

developing measures to relate form and adapt the design to the site, the region and the climate and as the last one; establishing a harmonious, long lasting relationship between the inhabitants and their surroundings by addressing the essence of good form-giving (Abidin, et. al,2008).

There are so many definitions of sustainable city and sustainable architecture dealing with these concepts with variety of approaches. There is no doubt that sustainable architecture challenges new and ingenious architectural design at various levels. However, as Sir Richard Rogers (2011) expresses, the historic city and its traditional building culture set a precedent for sustainable city and architecture. On the other hand, Urry (1995) emphasized that in an increasingly competitive global market where spatial and temporal barriers are diminishing, the specificity of a city - its character, history, buildings, culture and distinctiveness - becomes more important. The architectural and cultural heritages of cities together with their historical characteristics become dynamic values, which combine local and global. Sustainability and sustainable development policies are seen as key factors for the planning and development process in historic cities (Strange,1997) .

Being conscious about the responsibilities of architects in the way of achieving sustainable urban development, the authors put stress on the necessities of sustainability throughout architectural design studios they supervise. In the context of this paper, the process and final products of these design studios undertaken in undergraduate program of architecture in the Faculty of Architecture, Uludag University are discussed via some examples of student projects. First of all, the way of discussing the concept of “sustainability” in architectural studios will be summarized in the following section.

THE CONCEPT OF SUSTAINABILITY IN ARCHITECTURAL EDUCATION

Amos Rapoport who is a famous anthropologist and the leading founder of the field of Environment-Behavior Studies (EBS), put stress on that the purpose of design should be to provide settings appropriate to the bio-social, psychological, cultural and other characteristics and needs of the different people for whom design is done. He summarizes his thoughts as; the most important decision is what to do and why to do it rather than how it is to be done (Rapoport, 2000). Another anthropology and at the same time psychologist Setha M.Low defines designers as culture-makers because they give form to our cultural ideals, beliefs, and norms. She thinks that designers are responsible for understanding the complex relationship of culture and place and culture and built form. She argues that teaching about culture and place in an effective and useful way is one avenue for integrating this understanding into design practice and education. The teaching strategies of fieldwork, personal experience and self-reflection, and cross-cultural comparison provide a link between theory and practice which encourages students to discover the relationship of culture and place and its importance in the built environment (M.Low 1986).

These thoughts strictly points out the importance of the concept of “*sustainability*” in design education and light a way to the question of “*how should sustainability be handled throughout architectural design education?*”

The argument lies beyond this assumption is that designing for sustainability is a more complex process that requires a horizontal multidisciplinary interventions from the outset of a given project (Fleming, 2002: 147). Douvrou (2006) suggests a problem-based learning as an approach in the teaching of sustainable design. Boyer and Mitgang (1996) assert this vision; “Sustainable architecture suggests a curriculum built around collaboration and team work, not only with other architects but with other disciplines” (cited by Al-Hagla, 2012) .

In fact, not only the other disciplines but also all the actors who are involved in the design process like users, builders, local institutions, etc. should be taken into consideration in order to make the architectural students to be aware of the importance of the term of sustainability. In the light of these thoughts the authors adopt an integrative approach when discussing sustainability throughout architectural design process. In the following section the aim and scope of the architectural design studios, which the authors supervise will be explained.

THE CONCEPT OF SUSTAINABILITY IN DESIGN STUDIOS

In Uludag University, the Department of Architecture is subject to the first cycle degree system of higher education in the field of Architecture science that has 240 ECTS credits. The aim of the program is to bring up architects who have professional knowledge and capability for taking an effective role in the formation and transformation of the physical environment, can work in collaboration with the other disciplines, have the ability of making analysis, synthesis and interpretation, have awareness on the necessity of lifetime learning and have architectural professional responsibility and ethical values.

The design studio is the backbone of the architectural education in the Faculty of Architecture and the design studio approach is; to take into account the multidimensional structure of sustainability with a holistic and integrated approach including human factor. In the scope of this study, the aim and content of studios supervised in the fifth, sixth and seventh semesters will be described briefly.

The main aim is to achieve sustainable urban development of the city of Bursa, in which the project area locates. Being the first capital city of the Ottoman Empire Bursa is one of the most important historical cities of Turkey. It is an important focus point in social and historical aspects due to its location's being suitable for settlement; natural structure's favouring agriculture and military strategic importance (photo 1). The project area, Hisar has a special identity with its traditional urban fabric. It is located to the west of the city center on a hill overseeing the city and surrounded by the historic city walls. It includes traditional housing pattern preserved till our days, however, unfortunately a wide motorway has been constructed through the settlement in order to support the increasing traffic (photo 2).



Photo 1: Bursa in Turkey



Photo 2: Hisar Region

The main problematic of the studios was that; “ How can we protect the unique image of historic cities and how can we use it in our own time?” In the other words, “how can we obtain sustainability in historic cities? ” The answer of these questions were given in various theoretical and practical studies in the related literature as “*increasing quality of life*” and the students were asked to find ways of increasing urban quality of life in Hisar. In order to answer these questions via architectural and urban design proposals the students were directed to find out the physical and socio-cultural requirements of sustainability.

For the preliminary work of the design studio students undertook observations and archive analysis at the end of which they find out data related with physical environment, history and social demography of the settlement. They also conducted a survey to the residents of the settlement in order to understand socio-cultural and psychological characteristics of the inhabitants of the neighbourhood, and satisfaction and expectations of the inhabitants about their neighbourhood. The results they obtained helped them to understand that a mixed used residential environment is the key solution for achieving quality of life in Hisar.

Some examples of student projects developed for the aims which are achieving urban sustainability in Hisar, sustaining the image of this historic neighbourhood and raising the quality of life are as follows;



Figure 1: An example for 7th. Semester project (2010-2011 Spring)

Figure 1 shows the project of Tugce Uyulgan who offered a mixed used residential area together with shopping possibilities and a museum for recycling in order to raise the sustainability awareness of the residents. Accessibility and continuity were the supporting keywords of this project. Figure 2 shows the project of Onon Bibaatar, an Erasmus student who also offered a mixed used residential area with a city museum and a social center not only for the inhabitants but also for all of the residents of Bursa.

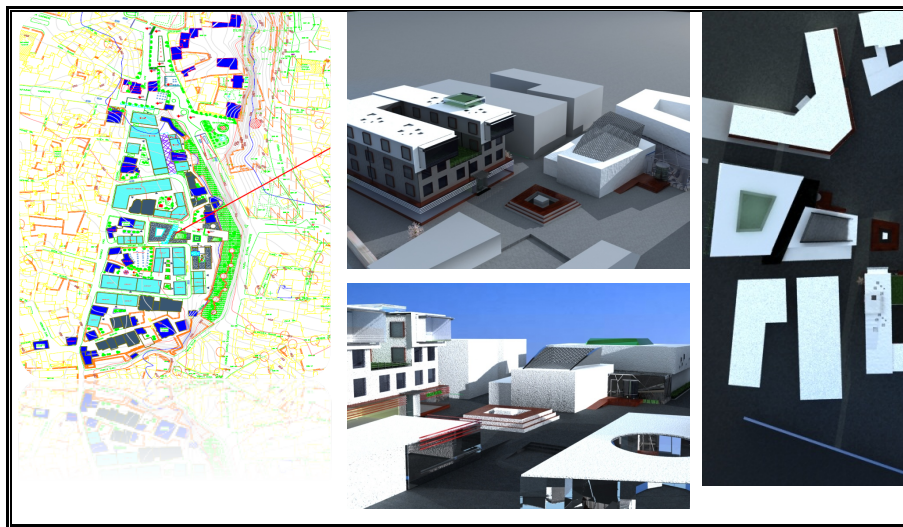


Figure 2: An example for 7th. Semester project (2010-2011 Spring)

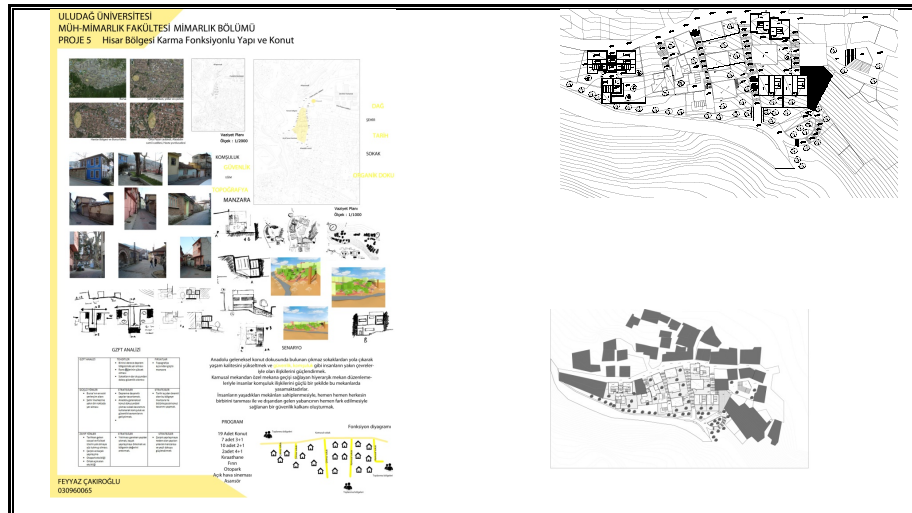


Figure 3: An example for 5th. Semester project (2011-2012 Spring)

Figure 3 shows 5th. Semester student Feyyaz Cakiroglu's project offering a mixed used residential environment composed of semidetached houses together with an education center for the retired and housewife residents of the area. Figure 4 shows the project of Yasemin Cay whose proposal is to revitalize the environment with the help of a fashion road including a silk factory introducing the production of silk textile which is traditional and unique for Bursa. This road also contains tailors, silk stores, boutique fashion stores and pensions for touristic accommodation.

Figure 5 shows a 6th. year student Bilge Sen's project who offered a library, a children's playhouse, an exhibition space together with the residential units. Figure 6 shows Zulal Sardag's project offering a socio-cultural complex including educational units, a performance hall, a multipurpose hall serving the whole city.

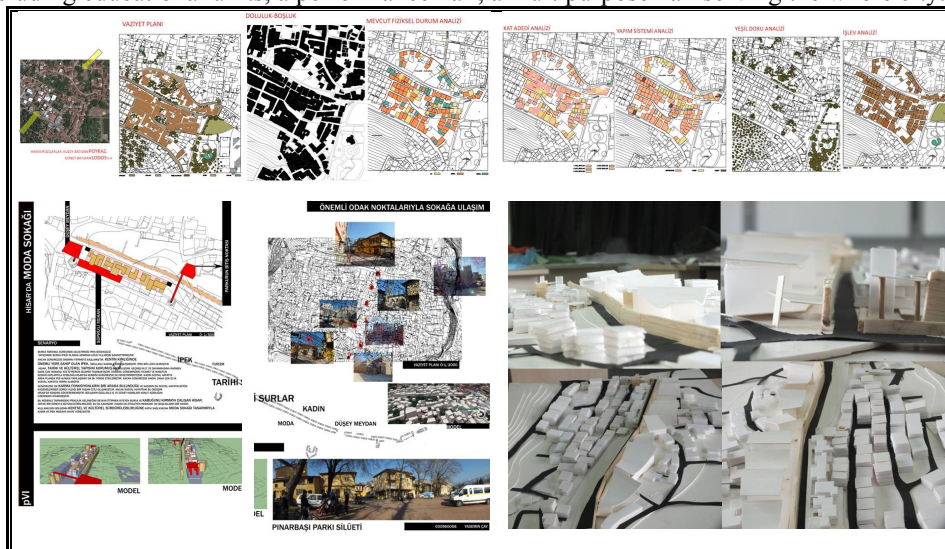


Figure 4: An example for 5th. Semester project (2011-2012 Spring)



Figure 5: An example for 6th. Semester project (2012-2013 Fall)



Figure 6: An example for 6th. Semester project (2012-2013 Fall)

CONCLUSIONS

Throughout these semesters in 14 weeks studio developing time give a chance to the students of architecture, in the other words the architects of the future, to understand how essential is to have an integrated and holistic approach in order to achieve sustainable urban development especially in a historic city. They also understand the links between all the physical, social, cultural and economic aspects of complicated architectural and urban design projects. At the end of their initial physical and socio-cultural analysis they reached to a conclusion that a mixed used development would be suitable for the area. Their proposals were including the buildings or building groups like socio-cultural complex, library, local education center, nursery school, sports hall, multi-purpose hall which were required by the local inhabitants of the settlement. Together with these social buildings residential units surrounded by quality public spaces were also designed. Throughout the process the most discussed concepts were sustainability requirements, cultural and architectural heritage, urban identity and contemporary architectural approaches. The expectation of the supervisors from the students was to develop architectural and urban design projects, which are not only in harmony with the heritage values of the environment and reflecting the identity of the city, but also include the contemporary and modern construction techniques and materials as much as possible. One of the most important aims of the studios was to strike a balance between the conservation activities and contemporary user requirements.

References

- Abidin S.A,et,all, 2008. “*On the role of forming-giving in design.*” New Perspectives in Design Education- Proceeding of the 10th International Conference on Engineering and Product Design Education. Universitat Politecnica de Catalunya: Barcelona;pp. 365-370
- Al-Hagla, Khalid S., 2012, *The Role of the Design Studio in Shaping an Architectural Education for Sustainable Development: The Case of Beirut Arab University*, International Journal of Architectural Research Archnet-IJAR Volume (6) - Issue (1).
- Becker, E., et.,al.,1999. Exploring Uncommon Ground: Sustainability and the Social Sciences, in *Sustainability and the Social Sciences*, pp.4-14, Eds., Becker, E. and Jahn, T., Zed Books, London.
- Boyer, E.L., & Mitgagng, L.D. (1996). Building community, a new future for architectural education and practice. The Carnegie Foundation for Advancement of Teaching. Princeton, NJ.
- Bruner, J. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.
- Cazden, C. (1986). Classroom discourse. In M.C. Wittrock (Ed.), *Handbook of research on teaching* (pp.432-463). NY:MacMillan.
- Davis, B.H & Brewer, J.P. (1997). *Electronic discourse: Linguistic individuals in virtual space*, NY: SUNY.
- Douvlu, E. (2006). Effective Teaching and Learning: Integrating Problem-based Learning in the Teaching of Sustainable Design. CEBE Transactions, 3, (2) 23-37.
- Fleming, R. (2002). Survivor studio @ Philadelphia University, Promoting sustainability in the design studio through collaborative game playing. International Journal of Sustainability in Higher Education, 4 (2) 146-154
- Keitsch (2012) Sustainable Architecture Design & Housing , in *Sustainable Development*, Vol.20 Issue 3 pp.141-145
- Levine , R.,S. et.,al.,1999. The Sustainable City of the 21st. Century: Westbahnhof, Vienna-Theory and Practice, in *XX.UIA Congress, Architecture of the 21st. Century, Academic Treatises Vol.1*, Beijing, 23-26 June, pp.68-72.
- M.Low,Setha, (1986). Teaching About Culture and Place: An Anthropological Perspectice. Built Form & Culture Research, Conference Proceedings pp.65.Rapoport,(2000), Studios Questions, in *Culture-Meaning-Architecture*, pp.103. Eds. Keith Diaz Moore ISBN 0 7546 1242 2
- Rogers ,R.,(2011) Briefing: Learning From Continuity & Change, *Proc.ICE, Urban Design & Planning* Vol.164 Issue: DP 1 pp.3-5.
- Strange, I., (1997). Planning for Change, Conserving the Past : Towards Sustainable Development Policy in Historic Cities, *Cities*, 14(4), 227-233
- Urry, 1995. Consuming Places, Routledge, London.
- WCED (1987) Our Common Future, *The Brundtland Report*, Oxford University Press, Oxford

Do High Schools Prepare For Entrance To Economic Universities?

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ABSTRACT

This paper presents results of analysis of entrance examinations for the University of Economics, Prague in the subject “English”. We carried out statistical analysis that take into account dimensions like time series for years 2011-2012 and type of high school. We have constructed correlation index between GCSE (General Certificate of Secondary Education) exams and entrance exams for the University of Economics, Prague. Conclusions then point that there is no strong dependency (correlation) between results from GCSE exam and results from entrance examination at the University of Economics, Prague. The correlation was analyzed on the subject of English.

Keywords: Knowledge; English; Education Process, Entrance Examination, GCSE - English

INTRODUCTION

Economic education is undergoing extensive changes, as is economic theory. The fundamental pressures on the abilities of students and graduates of economics subjects at university level are due to the practical disintegration of applicable economic theory and the impracticality of traditional macroeconomic instruments (Kuncova, Vojackova, 2012). Hand in hand with these new facts there are also changes in the paradigms of classical management. (Maryska, Doucek, Novotny, 2012; Finardi, Fischer, Mazouch, 2012)

These facts are also subsequently reflected in the changing requirements and demands made on economics and management students. A further part is played by yet another factor, this being the declining demographic curve for young people entering universities. Between 2012 and 2013 this drop represented roughly one third of the total number. There is no doubt that this also influenced the quality of applicants for university studies. Other aspect that influences quality of applicants is the level of expected average salaries for successfully graduates. This factor is for example analyzed in (Hanclova 2006; Marek, 2010) for local conditions of the Czech Republic. So what kind of student do we actually need for the study of economics?

At the University of Economics, Prague we are of the opinion that these should be students with knowledge of one or more foreign languages and then also students capable of working with abstract concepts. In the entrance proceedings for the majority of faculties we judge this latter through the ability to master a certain level of mathematics. With regard to the global environment, even though anti-globalization tendencies are now quite obvious, expressed for instance by the large world economies closing in on themselves, we are still convinced that the “lingua franca” of the present is the English language. This language is not only essential for world-wide communication, but it also has a certain degree of importance in the region of Central Europe, in spite of the fact that historically this area is focused linguistically on German and its history was linked for three centuries with the development of the Austro-Hungarian Empire. (Doucek, 2010)

The aim of this paper is to show the development and comparison of knowledge of the English language between the GCSE and the entrance examination for the University of Economics, Prague. Comparable study for Mathematics entrance examinations was published in (Maryska, Doucek, Mikovcova, 2013).

METHODS AND DATA COLLECTION

The data used in the research was obtained from the central data systems of the University of Economics in Prague. From these data was acquired both on the results of the entrance examinations and on the leaving certificate results of those applying to study, as well as data on the actual course of studies.

With regard to Law No. 101/2000, on the protection of personal data, all the data collected was rendered anonymous. Anonymizing the data involved the removal of all personal means of identification, including in particular names, surnames, birth numbers, etc. The output of anonymized data was the allocation of a numerical designation to each student participating in the entrance examinations. Backward identification of the individual student is not possible.

Due to the nature of the entrance examinations carried out at the University of Economics, Prague, data are not available for all faculties and all fields of study. The reason for this is the fact that some faculties (such as the Faculty of Economics) do not hold standard entrance proceedings, but accept students on the basis of the results of SCIO tests. SCIO tests are a national system for the testing of students, performed by an independent private

institution. It is the choice of each university in the Czech Republic whether it recognizes the results of these tests as relevant for the waiving of entrance examinations or not. At the University of Economics, Prague this system is used to waive the entrance examination in only one of the six faculties. (Maryska, Doucek, 2011)

A further factor influencing the completeness of data is the inaccessibility of the results of leaving certificate examinations, especially in the case of foreign students. “Artificial” records are then generated for them in order to create at least an environment that enables analysis of the results of the entrance exams and the results of exams during normal studies. These students are omitted from the correlation analyses of leaving certificate exams.

Due to the extent and complexity of the analyses, the results of analyses are presented in the following text only for selected characteristics.

Input Conditions

At the time of the start of the project the state General Certificate of Secondary Education in the Czech Republic were divided into two levels of difficulty – basic and higher. In 2012 the Ministry of Education, Youth and Sport abandoned the two-tier concept for the state GCSE and left only the basic level of leaving certificate examinations functional. This fact had a significant effect on the project, as our working hypothesis had been that the higher level of GCSE could replace the admission procedure at the University of Economics, Prague.

For specification of the evaluation of results we state, for the sake of completeness, that there are six faculties on University of Economics, Prague at this time - Faculty of Finance and Accounting (FFA), Faculty of International Relations (FIR), Faculty of Business Administration (FBA), Faculty of Informatics and Statistics (FIS), Faculty of Economics (FE), Faculty of Management (FM).

Methodology

Data acquired in the manner stated in the preceding text were processed by means of technology that permits working with a large volume of data. Concretely this means the platform of Microsoft SQL Server 2008 R/2 (MS SQL). Extracts of data from primary systems were carried out in two forms: in the form of text files and in the form of extracts in Microsoft Excel format. The choice of format was always that of the person responsible for the export of the data. Export of data in Microsoft Excel format was prevalent.

On the basis of this platform a data model was prepared of a data warehouse (DWH) in the traditional architecture of DWH Stage and DWH Core. For the filling of the data warehouse import and transformation processes were prepared, known as ETL (Extract Transform Load), in the instruments of Microsoft Integration Services (SSIS). Above the data prepared in the DWH an analytical model was created in Microsoft Analysis Services (SSAS), which are also part of MS SQL. Within the framework of SSAS data blocks and dimensions were prepared. The blocks represent pre-calculated data acquired from the DWH, which can be looked at from various views (dimensions). In this context dimensions are represented by registers, which permit analysis of values in analytical blocks. Prepared in advance in the data blocks were, in particular, the values of the following indicators - median, average, maximum, minimum and determining deviation, which describes various aspects of the investigated data.

The entire solution observes to the maximum possible extent the principles of the proposal and the implementation of data warehouses as described, for example, in (MacLennan, Tang, Crivat, 2009).

With regard to the user unfriendliness of the instruments mentioned so far, the user layers were created in Microsoft Excel. This was selected chiefly because all of the users are acquainted with the functionality and possibilities of this instrument. Microsoft Excel furthermore expands the group of indicators that can be used for the analysis of data. This expansion includes, for example, analysis of dependences, testing of hypotheses, etc.

RESULTS AND DISCUSSION

Among the primary results of the investigation is finding out how many students submitted applications to study at the University of Economics, Prague and what the level of admission to the individual faculties was. For the requirements of this paper there are two basic groups of results – on the one hand the overall analysis of the structure of applicants for study, the proportions of applicants according to country of origin, and then the results achieved in the entrance exam in “English”. The decline in the number of students from the Czech Republic may also be supplemented at Czech schools by admitting students from other countries, or eventually also by what is called delayed demand (studying after several years of practical work experience) (Kunstova, Rezankova, 2012). This is why part of the analyses carried out was not only the number of foreign students applying for admission to the VSE, but also a more detailed analysis of the results of their admission procedure. In this paper, however, there is no room for greater detail and so in Table 1 we give only the proportions of the first six countries in the number of students applying to study at the University of Economics, Prague.

1.1. Initial Knowledge of Foreign Languages – English Including

The English language was identified as the most frequent language for applicants at University of Economics, Prague. Summarizing of data is presented on the Table. 3

A student applying for the entrance examination to the University of Economics, Prague can choose from a number of languages approved for the entrance examination. English, German, French, Spanish, Italian and Russian are available. From the table below it can be seen that over the past four years students have selected mainly one of the first four languages. The Russian language has declined considerably as it is not permitted for study applicants from the countries of the former Soviet Union.

That the English language is represented most frequently is partly due both to its widespread and almost obligatory teaching at all secondary schools, and also in particular to the requirements of some faculties and fields of study (for example Faculty of Finance and Accounting, Faculty of Informatics and Statistics-specialization Applied Informatics etc.), which allow exams to be taken only in the English language.

Table 1: Proportions of Applicants for Study at the UPE According to Country Source: Authors

UEP Applicants	2010	2011	2012	2013
Czech Republic	82.62 %	82.27 %	77.84 %	78.83 %
Slovak Republic	7.19 %	7.23 %	7.03 %	7.59 %
Russian Federation	3.95 %	4.04 %	4.50 %	6.02 %
Kazakhstan	1.68 %	1.68 %	1.56 %	1.44 %
Ukraine	1.31 %	1.53 %	1.65 %	1.92 %
Vietnam Socialist Republic	0.97 %	1.33 %	1.53 %	1.83 %
Other Nationalities	2.28 %	1.91 %	5.88 %	2.37 %
Suma	100.00 %	100.00 %	100.00 %	100.00 %

Table 4. Entrance Exams in Foreign Languages 2010 – 2013 – Share of Languages Source: Authors

Language	2010	2011	2012	2013
English	91.44 %	93.04 %	91.98 %	94.55 %
German	6.59 %	4.88 %	5.33 %	3.69 %
French	0.96 %	1.12 %	1.16 %	0.76 %
Spain	0.52 %	0.64 %	1.02 %	0.65 %
Italian	0.11 %	0.07 %	0.12 %	0.05 %
Russian	0.39 %	0.25 %	0.39 %	0.31 %
Total	100.00 %	100.00 %	100.00 %	100.00 %

In the following tables analyses are made of the results of the entrance examinations of applicants wishing to study at the individual faculties of the University of Economics, Prague. In the last column – “Correl.” – are the values of the correlation between the result of the entrance examination and the result of the “English” exam taken at the University of Economics, Prague.

Table 5 describes development for the University of Economics, Prague as a whole, regardless of division according to faculties. From the Table 5, it is evident that for the university as a whole there are no marked shifts in the level of knowledge over the years either in the indicator Avg. (Average), or the more appropriate indicator Med. (Median).

The last column in the table (Correl.) shows that there is no more significant dependence between the result of the entrance exam and the result of exams in the course of the study of English.

Table 5. Entrance Exams in English 2011 – 2012 – Correlation to SGCE Source: Authors

Year	Count	Avg.	Med.	Mod.	Min.	Dev.	Var.	Skew	Skewnees	Correl.
2011	2,220	79.72	80.00	80.00	44.00	11.16	124.64	-0.52	-0.30	0.296
2012	1,806	79.05	80.00	90.00	40.00	11.78	138.75	-0.63	-0.06	0.253

Remark: The first data for 2013 could be collected after the end of winter semester of the school year 2013/2014. Detailed results for the individual faculties in individual years, which follow on from the preceding table, are given in Table 6 and Table 7.

The following Table 6 describes the situation in 2011. It can be seen clearly from the table that there are fundamental differences in knowledge of English in the applicants for the individual faculties. The lowest level of knowledge shown in the entrance examination is in the Faculty of Management (FM) and on the Faculty of Informatics and Statistics (FIS) and the highest standard, on the other hand, is at the Faculty of International Relations (FIR), which may be described as an expected result with regard to the fact that this is the faculty concentrating on international relations, for which knowledge of languages is a key factor. Even in analysis in

the individual faculties it is impossible to demonstrate significant dependence between the result of the entrance exam and the results of exams in the course of studies. The exceptions are the faculties FFA (Faculty of Finance and Accounting) and FIR, where the value of the correlation index reached the levels of 0.476 and 0.426 respectively.

Table 6. Entrance Exams in English 2011 - Correlation to GCSE - Faculties Source: Authors

	2011	Count	Avg.	Med.	Mod.	Min.	Dev.	Var.	Skew	Skewnees	Correl.
FFA	463	77.51	78.00	74.00	50.00	10.80	116.54	-0.13	-0.63	0.426	
FIR	867	82.09	84.00	92.00	50.00	10.97	120.33	-0.79	0.04	0.476	
FBA	436	81.11	82.00	80.00	54.00	8.89	79.11	-0.34	-0.01	0.264	
FIS	428	69.35	70.00	70.00	46.00	11.71	137.20	0.10	-0.77	-0.01	
FM	26	74.40	76.00	76.00	44.00	18.08	326.80	-1.60	2.90	0.068	

Table 7 depicts the state of points acquired in the entrance examination in 2012. In the FFA, FIR and FBA (Faculty of Business Administration) there was a slight increase in the value of the points achieved (from 1.55 points to 0.13 of a point), in the FIS there was a drop of around 0.5 of a point and the greatest drop was in the FM – roughly 4.4 points. This result is, of course, statistically significantly unreliable, because the data sample was very small. The result of the correlation at the FIS is very interesting, as here we found practically no dependence between the GCSE and the entrance examination.

Table 7. Entrance Exams in In English 2012 - Correlation to SGCE - Faculties Source: Authors

	2012	Count	Avg.	Med.	Mod.	Min.	Dev.	Var.	Skew	Skewnees	Correl.
	FFA	460	79.06	80.00	82.00	52.00	10.27	105.40	-0.34	-0.40	0.394
	FIR	589	82.24	82.50	90.00	50.00	10.28	105.75	-0.61	0.05	0.425
	FBA	258	81.63	84.00	86.00	54.00	9.99	99.78	-0.82	0.20	0.361
	FIS	485	68.73	68.00	70.00	40.00	13.50	182.27	0.01	-0.86	0.044
	FM	14	70.00	70.00		62.00	11.31	128.00			-0.05

With regard to the correlation in 2012 it can generally be said that it remains at a very similar value to that in 2011. While exploring the correlation between the GCSE examination and the entrance examinations we reached the following conclusions:

- For the basic level of the state GCSE examinations we arrived, with a sample of 6,443 applicants, at the correlation value of 0.4202.
- For the higher level of state GCSE exams we arrived, with a sample of 1,792 applicants, at the correlation value of 0.6204.

The conclusion arising from this is that the state GCSE examinations at the higher level could be used as a criterion for the admission of applicants for economic studies.

CONCLUSION

Research into the admission procedure at the University of Economics, Prague was originally undertaken in an effort to acquire basic material to strengthen the qualified decision-making of top management of faculties regarding the manner of admission of applicants to the university. For these needs we used standard statistical methods for statistical analysis on the data we acquired from the entrance exams of applicants for study. For the requirements of this paper and with regard to its limited possibilities, we present here only part of the results achieved for the subject of “English”. (Maryska, Doucek, Mikovcova, 2013)

In the course of our research we achieved the following results:

English language is the most frequent langue of applicants for study on UEP,

The statistical characteristics of the investigated sets of data are homogeneous with minimal deviations from the standard (standard deviation, obliquity, spikiness, etc.),

The results achieved in the admission proceedings in English language did not change much in the two years investigated,

The greatest correlation between the GCSE results and the admission proceedings at the University of Economics, Prague is demonstrated by applicants for the FIR.

The dependence between the results of the entrance examination and the result of the state GCSE exam did not alter in any remarkable manner,

- The dependence between the basic level of the GCSE and the results of the entrance examination is the moderately large correlation coefficient value of 0.4202.
- The dependence between the higher level of the GCSE exam and the results of the entrance examination is

the high correlation coefficient value of 0.6204.

References

- Doucek, P. (2010). Human Resources in ICT – ICT Effects on GDP. In: *IDIMT-2010: INFORMATION TECHNOLOGY - HUMAN VALUES, INNOVATION AND ECONOMY* Book Series: Schriftenreihe Informatik. vol. 32. Published: 2010. ISBN 978-3-85499-760-3. WOS:000288345500010.
- Finardi, S., Fischer, J., Mazouch, P. (2012) ‘Returns on private investment in education and fair tuition fees estimates: the case of the Czech Republic’ In: *9th International Conference on Efficiency and Responsibility in Education* (ERIE 2012), Prague, pp. 113–119. ISBN 978-80-213-2289-9
- Hanclova, J. (2006) Minimum Wage Impact on Wage and Unemployment Distribution in the Czech Republic. In proceedings of the 24th International Conference *Mathematical Methods in Economics 2006*. Pilsen: University of West Bohemia, 13th-15th September 2006. Pilsen: University of West Bohemia in Pilsen, 2006. pp. 213 – 220. ISBN 978-80-7043-480-2. UTWOS 000262064700019.
- Imhoff, C., Gallemmo, N., Geiger, J. (2003). *Mastering Data Warehouse Design*. Wiley Publishing. ISBN: 0-471-32421-3
- Kimbal, R., Caserta, J. (2004). *The Data Warehouse ETL Toolkit*. Wiley Publishing. ISBN: 0-764-57923-1
- Kuncova, M., Vojackova, H. (2012) STUDENT'S EVALUATION OF THE E-LEARNING COURSES AT COLLEGE OF POLYTECHNICS JIHLAVA, In: *EFFICIENCY AND RESPONSIBILITY IN EDUCATION 2012* pp. 303-314 Published: 2012, ISBN: 978-80-213-2289-9, WOS:000310175100034
- Kunstova, R., Rezankova, H. (2012). Analysis of selected elements of distance education. Praha 07.06.2012 – 08.06.2012. In: *Efficiency and Responsibility in Education*. Praha : Czech University of Life Sciences in Prague, 2012, s. 315–322. ISBN 978-80-213-2289-9. WOS:000310175100035
- MacLennan, J. Tang, Z., Crivat, B. (2009). *Data Mining with SQL Server® 2008*. Wiley Publishing, Inc., 2009. ISBN: 978-0-470-27774-4
- Marek, L. (2010) Analýza vývoje mezd v ČR v letech 1995-2008. *Politická ekonomie*, 2010, roč. 58, č. 2, s. 186–206. ISSN 0032-3233, (In Czech)
- Maryska, M., Doucek, P. Novotny, O. (2012). Requirements of companies on the knowledge ICT specialists for the ICT administrator role. Barcelona 02.02.2012 – 05.02.2012. In: *4TH WORLD CONFERENCE ON EDUCATIONAL SCIENCES (WCES-2012)*. [online] Amsterdam : Elsevier, 2012, s. 4389–4393. ISSN 1877-0428. URL: <http://www.sciencedirect.com/science/article/pii/S1877042812019969>. WOS:000314465904105
- Maryska, M., Doucek, P. (2011) ‘Comparison of the Czech and Austria Education Systems’ In: *IDIMT-2011: INTERDISCIPLINARITY IN COMPLEX SYSTEMS* Book Series: Schriftenreihe Informatik. vol. 36. pp: 23-34. Published: 2011. ISBN: 978-3-85499-873-0. WOS:000299185000002.
- Maryska, M., Doucek, P., Mikovcova, H. (2013). MATHEMATICS KNOWLEDGE ANALYSIS OF REGISTERED STUDENTS AT THE UNIVERSITY OF ECONOMICS, PRAGUE. In: *EFFICIENCY AND RESPONSIBILITY IN EDUCATION 2013*. pp: 405-411. Published: 2013. ISBN: 978-80-213-2378-0. WOS:000327802000053.

Do They Learn To Teach Science From Their Previous Teachers?

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ABSTRACT

This study aims to determine effects of teaching methods and techniques used by their previous teachers on science teachers' and preservice science teachers' curiosity and interest to learn science. In this study, it is intended to investigate effect of teachers' applications in the past that was remained in science teachers' and preservice teachers' memory and help them increase their demand and curiosity to learn science and also to lead them to be a science teacher. For the purpose of this study, preservice teachers studying at one of the institution and science teachers graduated at the same institution are chosen by easily accessible sample method. This qualitative study is performed as a survey. Data were collected through semi-structured interviews as one of the qualitative data collection techniques. Data obtained from the study was analysed by using content and descriptive analysis techniques and interpreted by the reserachers. It was found that, science teachers and perservice science teachers mostly remember (80%) lectures and writing lecture notes among their previous teachers' teaching methods and techniques. On the other hand, results showed that instead of lectures, they preferred experimentation, making projects, watching animations, researching and presentation methods. Science teachers and preservice science teachers stressed that these methods and techniques are interesting, intriguing and they provide learning by doing, connect with real life, objectify and visualize the content.

Key words: Science teaching, Teaching methods and techniques, Science teachers, Preservice science teachers

INTRODUCTION

Many methods and techniques are carried out to increase students' attraction against science lessonsto provide them to have positive attitudes and to increase their achievement in science lessons that are described as difficult to understand and boring by many students at the level of primary, secondary andeven higher education. Methods and techniques are flourishing together with updated science programmes and provide better possibility of explaining science subjects for teachers. However, the first condition for that teacher can explain science subjects in a more appropriate way is to raise science teachers who are better on their fields (Ergul, 2009). Studies carried out about how science teachers to be raised (Kennedy, 1999; Nuangchalerm, Prachagool, 2010; Soldat, 2009) have focused and made suggestions on how science education should be (Howes, 2002). In existing studies, it has been stressed that the academic information that teacher candidates took on teacher raising programmes is not sufficient and that they gain self-sufficiency and personal teaching experience are important. (Mellado, 1998; Morrell and Carroll, 2003; Doyle, 1997). The role of science teachers who raised well, beside transferring information to students on science subjects, are that they provide students to gain basic skills, attitudes and values, to collaborate with each other and to improve their skills to debate. Therefore, it is needed that they enrich teaching method and techniques that they have and choose which are proper to lesson process (Aktepe and Aktepe, 2009; Sahin, 1998; Taskaya, Sürmeli, 2014).

The importance of that teachers benefit various teaching methods and techniques in teaching is understood when Physics, Chemistry, Biology, Environment subjects which are available on frame of Science Education are considered. There are many various methods and techniques that can be used towards science education teaching (Kaptan, 1999; Gurdal, Sahin and Caglar, 2001).In studies carried out, it has been determined that teachers want to practise an education based on experiment and practising by stressing the importance of learning-in-doing and connecting science subjects with real life in science education (Ergul, 2009; Lowery, 2002). In this direction, it has been determined that they prefer teaching model based on constructivist model from modern teaching methods and that they mostly stressed inquiry-based-learning (Ergul, 2009; Pekmez and Can, 2007).Beside methods and techniques that teachers used in science education, the reason of choosing these methods and techniques are also important. In this direction, it has been tried to reveal in this study what science education implementations that get teacher and teacher candidates' attraction, that make them bored or enjoy during their teaching life process are and whichever they used in their own teaching. Thus, it has been investigated whether or not there is a difference between practices that are carried out by teachers and practises that are thought to be carried out by teacher candidates.

In this study, answers have been sought to those questions:

Of science education teachers and preservice science teachers;

1. Which implementations of their teachers that they received science education before university do they remember?
2. What are their thoughts on their implementations carried out during science education?
3. How do these implementations effect science education that they made or they would make?

METHOD

This study is based on survey model and it aims to determine which practices their science teachers' applied during science teachers and preservice science teachers science education process before their undergraduate education and also to find their opinions about these practices and to investigate the effect of these practices on their science teaching practices that they apply or will apply.

Sample

In this study, firstly, it was tried to determine science teaching practices which draw sample groups' attention, or make them bored or enjoy during their school life. In addition, it was tried to revealed which of these practices they apply during their teaching profession. For that reason, both science teachers and preservice science teachers were preferred as sample group. In this way, it was tried to find whether there is a difference between practices made by science teachers and practices which will be considered to apply by preservice science teachers. Therefore two separate study groups were generated.

When creating the first study group, random principle was considered and 29 preservice science teachers were selected voluntarily among the 4th grade preservice science teachers whom were in 2014-2015 academic year at Marmara University Science Education Department

When creating second study group, science teachers whom work in public schools affiliated to the Ministry of Education and were graduated at the same university in the previous years of the same program. These teachers were reached through social media. 27 science teachers were participated to this study voluntarily.

Collecting the data

In this study, data were collected through interviews technique which one of the qualitative data collection methods. Prepared questionnaire was consisted of five questions including two multiple choice and three open ended questions. Two experts were consulted for the validity of prepared form. In accordance with the suggestions from experts interview form was fixed and applied to two preservice science teachers and then incomprehensible questions were revised. After necessary corrections, the form was put into the web in 2014-2015 spring semester and answered by preservice science teachers and science teachers via internet.

Interview form;

In the first question, by giving multiple choice, study groups were asked which practices their teacher apply during their science teaching. In the fifth question, they were asked of these practices which of them they apply or will apply. In the second question, which of the practices they remember during their science teaching applied by their teachers. In addition, of these applications the reasons they recall also were asked to study group. In the third question, which of these practices increase their interest in science were asked to study group. In the fourth question, they were asked to write in detail the practice they recall. The questions are as follows:

1. Which of the methods and techniques your teachers apply in science lessons (options were presented)?
2. Which of the practices you remember in science lessons that your teachers apply during middle and high school years, and why?
3. Of these practices which of this/these increase your interest towards science lessons, and why?
4. Write a practice in detail you most recall and still recall in science lessons during middle and high school years by explaining the reasons.
5. Which of these practices you prefer or will prefer in your teaching profession (options were presented)

Data Analysis

Data obtained from the interview forms were analysed by using descriptive and content analysis and then interpreted by the researchers and presented in tables. During second question content analysis, three categories were generated. In analysis of other questions descriptive analysis were used and frequency and percentage values were presented in tables.

FINDINGS

Data obtained from interview forms which applied to the teachers and preservice science teachers were presented as tables and frequency and percentage values were interpreted. Responses given to second question was separated by three categories by using content analysis and examined.

Besides frequency and percentage values, fourth question was presented by using teachers' and preservice teachers' expressions. Firstly, first and fifth questions in the interview form were evaluated together and

persented in table. Teachers' and preservice teachers' responses were evaluated considering their recalls and practices.

Table 1: Distributions of the results of practices that teachers' and preservice teachers' remember and apply related to science teaching

My teacher was doing... (Options of first question)	Science Teachers (N:27)				Preservice Science Teachers (N:29)				I will do... (Options to fifth question)
	f (1) ²	%	f (5) ³	%	f (1) ¹	%	f (5) ²	%	
Taking notes	23	85	23	85	26	90	5	17	Taking notes
Teaching	25	93	15	56	27	93	6	21	Teaching
Teacher made experiments and students observe them	15	56	19	70	16	55	24	83	Teacher made experiments and students observe them
Students make experiments teacher control them	6	22	20	74	3	10	22	76	Students make experiments teacher control them
Trips around the school garden and make us collect materials (leaf, stone, seed, ..)	5	19	19	70	6	21	17	59	Trips around the school garden and make us collect materials (leaf, stone, seed, ..)
Trips (zoo, botanic garden, scientific museum or factory)	2	7	13	48	8	28	22	76	Trips (zoo, botanic garden, scientific museum or factory)
Trips in school or around the school and make observations	1	4	13	48	6	21	20	69	Trips in school or around the school and make observations
Solving tests	16	59	17	63	18	62	7	24	Solving tests
Teacher do projects and students observe them	1	4	5	19	0	0	12	41	Teacher do projects and students observe them
Make students do projects	6	22	22	81	3	10	23	79	Make students do projects
Make students do drama	2	7	14	52	4	14	20	69	Make students do drama
Applying analogies	9	33	23	85	6	21	23	79	Applying analogies
Teach subjects using games	3	11	15	56	6	21	17	59	Teach subjects using games
Solving puzzles	1	4	11	41	1	3	10	34	Solving puzzles
Giving research homework	19	70	26	96	8	28	17	59	Giving research homework
Presenting homeworks in classroom	10	37	23	85	12	41	7	24	Presenting homeworks in classroom
Watching animations	2	7	21	78	4	14	27	93	Watching animations
Watching CD related to the subject	8	30	22	81	9	31	23	79	Watching CD related to the subject

Table 1 shows that both science teachers and preservice science teachers mostly remembered lecturing (93%) methods related to science teaching that their teachers applied. While teachers mentioned that they used lecturing method with 56%, preservice teachers mentioned that they will use this method with 21%. Both two groups' mostly remembered second method is note taking. This method is remembered by teachers with 85% and preservice teachers with 90%. Teachers specified that they use this technique with 85%, on the other hand preservice teachers specified that they use this technique with 17%. While teachers specified that their mostly remembered third method is giving homework with 70%, preservice science teachers mentioned solving test with 62%.

²Results obtained from answers to first question

³ Results obtained from answers to fifth question

In table 1, it can be seen that, while 96% of teachers prefer to give research homework, 59% of preservice science teachers prefer this method. 93% of the preservice science teachers specified that using animation is the first method they will prefer for science teaching. 83% of them specified demonstration experiments, 79% of them specified doing project, using analogy and watching video that they will prefer for science teaching. However, 80% of the teachers stated that they prefer methods such as using analogy, doing projects, watching videos and presenting homeworks. While the least remembered methods by the teachers are trips around the school and observations (4%), projects doing by the teachers and solving puzzles, the least practices they mentioned is doing projects and presenting them to the students (19%). On the other hand, preservice teachers did not mark this option, differently, they stated taking notes as the least applied method (17%).

In the second question, science teachers and preservice science teachers were asked what were the practices their teachers apply in science lessons that they attended before their undergraduate education and also why they still recall these practices.

Findings obtained from interview form are presented in Table 2 and 3. During data analysis, three categories were generated by implementing content analysis. In this way, the most recall practices were separated in three categories including; classical methods, alternative methods and visual methods. As can be seen in Table 2 and 3, remembered practices were put into the categories and the reasons that they recall were grouping as enjoyable and boring. After that frequency and percentage values were determined.

Table 2: Distribution of the boring and enjoyable practices and their reasons remembered by science teachers

Categories	Practices applied by the teacher	Student's opinion N (27) ⁴		Reason to recall (frequency)
		Enjoyable (f)	Boring (%)	
Classical methods	Note taking		7 26	Drawn to sentences in the book, (1)Writing continuously, Note taking (6)
	Teaching		10 37	Ordinary (1) Unable to associate with daily life (1) Routine (3), Not included visual practices (2) Boring (3)
	Group working		1 4	Inhomogeneity of the group and unable task sharing (1)
	Problem/Test solving		1 4	Ordinary(1)
	Preparing homework	1	4	Provide active participation (1)
	Question-answer	1	4	Associating with daily life (1)
Alternative methods	Game	1	4	Interesting (1)
	Analogy	2	7	Enjoyable and have witty metaphors (2)
	Trip around school	2	7	Have tangible observations (1) Interesting and enjoyable learning environment (1)
	Doing project	2	7	Provide active participation (2)
Visual applications	Using colored chalk	1	4	Interesting (1)
	Experiment	16	59	Do less (3), concretizationı (1), Using different thing other than book and notebook (2) Appealing all of the senses (1), Provide active participation (2), Interesting (4) Preparing experiment reportı (1) Seeing laboratory materials is interesting (1) Doing experiments by ourselves (1)
	Watching documentary	2	7	Interesting (2)
	Using projection	1	4	Interesting (1)
	Using scientific book and journal	1	4	Different and interesting (1)

⁴Total of the percentage is not 100 since responses obtained from each interview form include more than one data

In the last column of the table reason of the recall and frequencies were presented. According to Table 2, science they could not associated with daily life, science teachers evaluated classical methods (26%) and tesching (37%) as boring. In addition, since unable to task sharing, group working, a classical method, evaluated as boring. However, methods such as question-answer and preparing homework which are classical methods, considered as interesting and enjoyable (4%).

Remembered practices which are placed in alternative and visual methods categories are evaluated only as interesting and enjoyable. Laboratory practices was placed into visual practices and using less by the teachers, providing visuality and being interesting are the reasons why these practices recall.

Table 3: Distribution of the boring and enjoyable practices and their reasons remembered by preservice science teachers

Categories	Practices applied by the teacher	Student's Opinion N (29) ⁵				Reason to recall (frequency)
		Zevkli (f) %		Sıkıcı (f) %		
Classical methods	Note taking			3	10	Boring (1) Instructive (1) Tiring (1)
	Teaching			18	62	Reduce efficiency of the course (2) Boring (14) Unable to active participation (2)
	Group working	1	3			Permanent(1)
	Question-answer	3	10	1	3	Enjoyable (1) Using brainstorming (1), Less tiring comparing to note taking (1) Boring (1)
	Preparing homework			1	3	Inefficient work (prepared and presented by certain stuents) (1)
	Problem/Test solving	1	3			Including questions related to LYS (1)
						Enjoyable (1)
Alternative methods	Game	1	3			Enjoyable (1)
	Analogy	2	7			Making concrete and visual (2)
	Tip around school	1	3			Presenting concrete examples (1)
Visual practices	Experiment	12	41	3	10	Enjoyable and visual (8) Making concrete (1) Associating with daily life (1) Visual and interesting (1) Memorable (1) Demonstration does not provide thinking and investigating (3)
	Drama	2	7			Permanent and enjoyable (1) Providing active participating (1)
	Animation	2	7			Using visuality and concrete elements

⁵Total of the percentage is not 100 since responses obtained from each interview form include more than one data

When examined the data presented in Table 3, it can be seen that lecturing (62%) is the most remembered practices in classical category by science teachers. Preservice science teachers remember this method as boring, unable to active participation, has low efficiency. Secondly, preservice science teachers' remember laboratory practices (41%) which are enjoyable, visual, concrete, memorable and associate with daily life. In addition, demonstration (10%) which is one of the laboratory practices remembered as boring and unable to reach the teaching goals. Moreover, games, analogy and trips around school are remembered by preservice teachers since they are concrete, enjoyable and visual. Question-answer techniques specified as enjoyable with the percentage of 10% and boring with the percentage of 3%.

In the third question, teachers and preservice teachers were asked which of the practices increase their interest toward science lessons that their teachers applied before undergraduate education. Findings obtained from responses to the interview form is presented in Table 4 and 5. In these tables, it can be seen that laboratory practices specified the most memorable method (59%) by science teachers in their past experiences. As mentioned in Table 4 the reasons are that, this practices is used less by the teachers, increase students' curiosity and interest, associate experiments with daily life, create interest and curiosity toward experimental materials. In addition, 26% of the teachers stated that science interest did not occur, because basically they did not encounter with an interesting practice.

Tablo 4: Distribution of the practices and the reasons that increase science teachers' interest towards science lesson

Practices that increase interest	N:27 f %		Reason Because
Games	1	4	It is interesting (1)
Analogies	1	4	It is interesting (1)
Using the board effectively and organized	1	4	It is interesting (1)
Doing project	1	4	The idea of creating product is interesting (1)
Trips around school	1	4	It explore the connection between life and science (1)
Doing research homework	1	4	I collect the information (1)
Laboratory practices	16	59	Experiment were rarely done (2) Lessons are more enjoyable (2), Teacher's making experiment draw my attention (1), I prepare an experiment report (1), Seeing materials draw my attention (1), It provides concrete (1), Touching experimental materials draw my attention (1), Since related with daily life (2), Doing experiments with my friends draw my attention (1) It creates curiosity and interest (3), I get responsibility in experiments (1),
Using visual materials	3	10	Encourage scientific journals and articles (1) Watching documentary (1) Using torso model (1)
I had no interest	7	26	I have never seen neither an experiment nor a project (1), Lecturing and solving problem were always used (1), I had difficulty to understand (1) There wasn't any practice that increase my interest towards science (4)

Science education teachers' opinions are presented in Table 5. According to this table, laboratory application is the main application that increase science education teachers' interest towards science. As the reason of this result, it is stated that laboratory practices are interesting and intriguing. 17% of the preservice science teachers specified that there was no practice before their undergraduate education that increase their interest towards science. They explained the reason as different and interesting practices were not made during that time.

Science teachers and preservice science teachers stated the reasons why they remember practices that increase their interest towards science are as follows; these practices are associated with daily life, students can participate actively, they increase students' interest and curiosity, they are visual and concrete applications

In the fourth question, students are asked to write a practice that they still remember during their science lessons in their middle and high school years. They also asked why they still remember these practices in detail. Responses related to this questions are presented in Table 6 and 7. According to the teachers' responses presented in Table 6, laboratory practices are the most remembered applications. In addition, lecturing, since it is boring, is in second place with the percentage of 15%.

The reasons why they remember them as recalled practices are as follows; they are more attractive, enjoyable, and provide active participation.

Table 5: Distribution of the practices and the reasons that increase preservice science teachers' interest towards science lesson

Practices that increase interest	N:29 f %	Reason Because
Analogies	4 14	Associated with daily life and being concrete (2) Applications that have benefited from the rich visuals (1) Provide active participation (1)
Using the board effectively and organized	1 3	Regular drawings and systematic expression (1)
Doing project	1 3	Revealed a product with our own effort (1)
Trip around the school	1 3	Provide active participation (1)
Doing research homework	1 3	Demonstrate a product with our own knowledge and efforts and can be associated with daily life (1)
Laboratory practices	17 59	Increase my curiosity and I learn by myself (3) Cause to understand concretely (2), Interesting (8), Visual application (1) Associated with daily life, active participation (1), Experiments created awareness in daily life (1) The application is made using all the senses (1)
Using visual materials	3 10	Applications that have benefited from the rich visuals (1)
I had no interest	5 17	No teacher has to practice to increase my interest in science lessons (2) Same methods were always used (1) My interest has started at university (2)
Drama	2 7	Associated with daily life and being concrete (1) Provide active participation (1)
Teachers' personal characteristics	2 7	Teachers' knowledge was enough and relationship with the students were well (1) The teacher whom increase students' self confidence (1)
Question-answer	2 7	Ask questions related with daily life (2)
Computer based practices	1 3	Interesting (1)

Table 6: The distribution of the practice that science teachers did not forget related to science courses and it's reason

Remembered practices	N:27 f %	The reason why it is remembered (frequency)
Analogy	1 4	Teaching as if it is game (1)
Experiment	12 44	Doing for the first time or less (5) Being attractive (4) Out of routine (1) Doing by myself (1) Visuality (1)
Collecting materials in the garden and examining them	2 7	Making with real materials (2)
Science/Project weeks	1 4	Participation is mandatory and it is interesting (1)
Solving problems that prepare students to university exam	1 4	Boring (1)
Teaching	4 15	Boring (4)

Watching scientific documentary	1	4	Being attractive(1)
Doing project	1	4	Doing by himself/herself(1)
Research homework	1	4	Permanant and enjoyable (1)
No answer	3	11	

Responses to this question shows that science teachers remember laboratory practices while they were learning science, because these applications are interesting and with these practices it could be exceeded the routine. In addition, watching documentary from the CD and doing project also are remembered by the teachers because they contain diffrences.

Teacher 11: “Spesifically we had watched CD related to science. After watching that, I decided to have a cereer in the field of science. Only this practice we had done in lesson was so effective for me. If we had the opportunity to watch more documentaries I think it would be much more useful”

Teacher 15: “The only lesson we had exceeded from lesson was examination of a cell under microscope in abiology lesson. It has exceeded from the current course, an experiment was designed and teacher had come to class already making preparations”.

Teacher 17:” [.....] Completing a project with my own effort was the most remembered practice for me. Except form y biology teacher no teacher entered my science courses had done such a practice. They just was lecturing and wanted us to take notes”.

Teacher 20: “A bacteria that I had seen under the micropcope in middle school was so affected me. Because it was the first time that I had met with micro world. These were not telling in books and we could see them affected me”.

Responses to question 4 given by preservice science teachers are presented in Table 7. According to this, as science teachers even more than they, preservice science teachers (59%) stated that laboratory practices had remained in their minds. The reasons why they recall this practice stated as follow: thie method is interesting, concrete, have active participation and encourage to inquiry. However, whilst two preservice science teachers mentioned troubles occurs in the laboratory, one of them mentioned the tasteless of the demonstration

Table 7: The distrbution of the practices and about science lesson that preservice science teachers did not forget and the reasons

Remembered practices	f%	N:29	The reason why it is remembered (frequency)
Experiment	17	59	Tasteless of the demonstration (1) Trouble in the laboratory(2) Based on inquiry (2) Active participation (3) Scientific process skills are used (1) Materials make visualization are used (2), Provide association with daily life (1) First time made (2) Interesting (3)
Colecting materials in the garden and examining	1	3	Working with concrete materials (1)
Scientific trips to museum, exhibition, etc.	1	3	Interesting and include concrete materials (1)
Using visual material	4	14	Using nodels (4)
Drama	2	7	Provide active participation and concretization (2)
Lecturing and take notes	1	3	Classical, boring and exhausting Klasik sıkıcı ve yorucu olması (1)
Reserach homework	2	7	Preparing individually and presenting in the classroom (2)
No answer	1	3	

As can be seen from the responses to question 4 by the preservice science teachers, experiments are effective, because they are interesting and perceptible evisual elements. As drama practices provide active participation and research homework also learned by doing, both of them create pleasent and permanent learning.

Preservice science teacher 10: “Examination of the hearth experiment had drawn my attention. I think it was very similar to the way we see the pictures in the textbooks. Our teacher had cut a very ingenious way, we had seen every part and touched inside and outside structure of the hearth. It was very impressive examination. When we did this experiment in university, I was very excited and was feeling myself experienced”.

Preservice science teacher 14: “Water wave experiment is the most memorable practice in my mind. We had seen what the intended use of information and formulas that we had learnt in class. We had found an opportunity to watch the movements of the waves visually”.

Preservice science teacher 15: “Our biology teacher had used a method similar to drama while teaching photosynthesis subject. He likened the chosen students to structure involved in photosynthesis. For example, one student was likened to the sun, one student was likened to the ferredoxin and another student was likened to the cytochrome. Then he tried to explain the flow of electron in each structure by students’ touch with each other. At this stage, our teacher also undertook the task routing. I think, since I had actively participated this activity, teaching differently from the other lessons, and I listened with pleasure, it is still in my memory”.

Preservice science teacher 19: “In high school years, an observation study that I had done for Chemistry lesson was stayed in my mind. The subject of assignment was determination of sugar and urea in urine. I first learned the theoretic part of the assignment, then by asking the hospital I had got information to find out how it was done. After that, during a week out of school time in hospital laboratory, I did a study on the on how the samples were examined and analysed. Later on, I had presented this study in the class. [...] I remember this studying in the laboratory since it provide both permanent learning and enjoyment during one week”

DISCUSSION

In this study, it has been aimed to reveal what implementations that science education teachers and science education teacher candidates remember from the past while learning science are and whether or not these implementations have an effect while teaching science. Many studies about science teaching, too, make an emphasis to methods that student learned by doing and experiencing, in which active participation is in for permanent learning (Alkan and Kurt, 2008; Senocak, 2006). It has been thought that this study would create an opportunity for the sake of reconsidering science education methods by determining what the implementations that attract attention to science are. The reason why two separate studying groups are included in the study is to investigate whether or not there is a difference in preference of science teachers who is teacher and has not become teacher yet. When looked at the result of study, it has been seen that the most distinctive difference between preference of teachers who are working and of those teacher candidates who have not become teacher is seen they prefer traditional methods like straight-telling, making students note, solving problem and give students’ homework and make them give presentation.

In this study, parallel result on the other studies have been determined, beside these methods, it has seen that other techniques such as experiment, brain-storm, question answer, discussion have been preferred (Aktepe and Aktepe, 2009; Sonmez, 2002; Taskaya and Surmeli, 2014). The reason of that story-telling method was preferred more when compared with other methods is connected with physical conditions of schools (Taskaya and Surmeli, 2014).

According to results obtained from second question of which content analysis are conducted, teachers and teacher candidates have stated that techniques from classical methods such as straight-telling, making students note, solving problem is not effective by describing them boring, rutin, tiring, based on rote. They find alternative methods and visual implementations as enjoyable and effective since they are catchy, interesting, and open to active participation and they present concrete examples connected with daily life. The importance of education methods that make students active participation to lesson possible were stressed in the other studies and it has been stated that, at the same time, this kind of studies has effected student’s achievement in the positive way (Mitchell, Foulger, Wetzel and Rathkey, 2009; Schulte, 1999).

In the study carried out, each of study groups has stated laboratory practices as most effective and catchy method but teacher candidates, by contrast with teachers, has stated demonstration experiment as boring and ineffective by giving them a separate state. Again, both study groups have stated laboratory practices as main practice they remember and that increase their interest in science but using visual materials are in a more usable state for both groups by compare with other methods and techniques.

As result, it has been seen that teachers and teacher candidates remember practices in which they themselves participated and involved and carried out in laboratory more vividly except demonstration experiments. Also, it has been determined that practices which teachers and teacher candidates told they used or would use are on experimenting. In short, learning science in its own kitchen is more effective.

SUGGESTIONS

When results of current study are considered; it could be suggested that:

- Lessons are carried in laboratories to increase interest and curiosity towards Science
- To give place to experiment about every topic

- To give opportunity to experiments in which students would be active and carry by themselves rather than demonstration experiments.
- To give learning methods based on investigating and researching by enhancing with experiments.
- Not to use classical methods such as straight-telling and making students note unless it is necessary.
- Different method and techniques such as drama, analogy, plays and puzzle are able to be occasionally given place to increase students' interest.
- To visit out of school learning environments such as science museums, museums, zoo and botanical gardens where could be related to science at least one time in every semester.

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References

- Aktepe, V. ve Aktepe, L. (2009). Fen ve teknoloji öğretiminde kullanılan öğretim yöntemlerine ilişkin öğrenci görüşleri: Kırşehir BİLSEM örneği, *Kırşehir Eğitim Fakültesi Dergisi*, 10 (1), 69-80.
- Alkan, C. ve Kurt, M. (2007). *Özel Öğretim Yöntemleri: Disiplinlerin Öğretim Teknolojisi*. (3. Baskı) Ankara: Anı Yayıncılık
- Doyle, M. (1997). Beyond life history as a student: pre-service teachers' beliefs about teaching and learning. *College Student Journal*, 31, 519-532
- Ergül, R. (2009). Elementary pre-service teachers' opinions on teaching science. *Bulgarian Journal of Science and Education Policy*, 3 (2), 152-172
- Gürdal, A., Şahin, F. ve Çağlar, A. (2001). *Fen eğitimi: İlkeler, stratejiler ve yöntemler*. İstanbul: Marmara Üniversitesi Yayınları.
- Howes, V.E. (2002). Learning to teach science for all in the elementary grades: What do pre-service teachers bring? *J. Research Science Teaching*, 39, 845-869
- Kaptan, F. (1999). *Fen bilgisi öğretimi*. İstanbul: MEB Yayınevi.
- Kennedy, M. M. (1999). *The role of preservice teacher education*. In Darling-Hammond, L. and Sykes, G. *Teaching as the Learning Profession: Handbook of Teaching and Policy* (54-86). San Fransisco: Jossey Bass.
- Lowery, N.V. (2002). Construction of teacher knowledge in context: preparing elementary teachers to teach mathematics and science. *School Science and Mathematics*, 102, 68-84
- Mellado, V. (1998). The classroom practice of pre-service teachers and their conceptions of teaching and learning science. *Science Education*, 82, 197-214
- Mitchell, J., Foulger, T.S., Wetzel, K., Rathkey, C., (2009). The negotiated project approach: Project vased learning without leaving the standards behind. *Early Childhood Education*, 36, 339-346
- Morrell, P.D. & Carroll, J.B. (2003). An extended examination of pre-service elementary teachers' Science teaching self-efficacy. *School Science and Mathematics*, 103, 246-252
- Nuanchalerm, P., Prachagool, V. (2010). Influence of teacher preparation program on preservice science teachers' beliefs. *International Education Studies*, 3 (1), 87-91.
- Pekmez, E.S. & Can, B.T. (2007). The reflection of 2000 and 2004 science curricula on the prospective teachers. *J. Turkish Science Education*, 4, 109-118
- Schulte, P. L. (1999). Lessons in cooperative learning. *Science and Children*, 44-47
- Soldat, C.S. (2009). *Investigating the impact of preservice program on beliefs about science teaching and learning*. Yayınlanmamış Doktora Tezi. Iowa: The University of Iowa.
- Sönmez, I. (2002). *İlköğretim 4. ve 5. Sınıf fen bilgisi öğretiminde kullanılan metotların öğretmenler açısından değerlendirilmesi*. Yayınlanmamış Yüksek Lisans Tezi. Konya: Selçuk Üniversitesi Sosyal Bilimler Enstitüsü.
- Şahin, F. (1998). *Okul öncesinde fen bilgisi öğretimi ve aktivite örnekleri*, İstanbul: Beta Yayıncılık A.Ş.
- Şenocak, E. (2006). *Probleme dayalı öğrenme. Fen ve Teknoloji Öğretimi*. (Edt. Bahar, M.). Ankara: Pegem A Yayıncılık. 78-104.
- Taşkaya, S. M., Sürmeli, H. (2014). Sınıf Öğretmenlerinin Fen ve Teknoloji Dersinde Kullandıkları Öğretim Yöntemlerin Değerlendirilmesi. *Gaziantep University Journal of Social Sciences*, 13 (1):169-181

Do We Test During Entrance Examination What We Really Need?

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ABSTRACT

Our article analyzes entrance exam results in “English” and results from standard exams from “English” at the University of Economics, Prague (the UEP). The article represents a partial output of the analysis of study prerequisites for economic studies. Using identified anonymized data obtained from entrance exam results and from study results, we calculated the basic statistical characteristics of the files and analyzed the time series for the years of 2010 – 2014. This article formulates work hypotheses concerning entrance exam results in both types of exams in “English” and tries to find out a correlation between these results. When processing the data, we had to reject the formulated null hypotheses based on the F-test and T-test

Keywords: Entrance Exam; Study Exams; English; Correlation

INTRODUCTION

The drop in the population curve in the Czech Republic is currently reaching the lowest values and therefore, the lowest number of students are applying to universities. In compliance with this fact, the Ministry of Education, Youth and Sports is changing its science and research policy and support of university education in the Czech Republic. This drop in the number of students (Fiala, Langhamrova, 2009) then leads to reduction of educational institutions, which will consequently result in their shortage once the number of students increases. Very interesting is, that although lower number of students is applying to the universities the number of students is increasing. That means the ratio accepted/rejected students is increasing in favor of accepted applicants.

Due to the limited space of this article, we present only the results of the basic admission procedure analyses. Our goal is thus to analyze the entrance English exam results and standard English exam results of students applying to the UE, Prague during the years of 2010 – 2014 and their correlation.

The proposed models and analyses are mostly based on the study (Psacharopoulos, 1995), the experience of the UE, Prague from prior projects with a similar topic (Scholleová, Mikovcová, 2011; Fischer, Finardi, 2010; Smutny, Nedomova, Mikovcova, 2014) and the research of education systems in European countries (Maryska, Doucek, 2011), (Ala-Mutka, Punie, Redecker, 2008).

Problem Formulation

We focus in our research on a relatively specific area – the analysis of entrance exam results and the analysis of exam results of the students of the University of Economics during their studies. Our research is a part of the other surveys performed at the Faculty of Informatics and Statistics.

Our analyses enhanced solution of the key problems that is currently solved at the University of Economics in Prague, such as in particular whether or not the knowledge tested in the entrance exam corresponds with the knowledge necessary for studies, whether or not there is a correlation between entrance exam results and regular exam results and whether or not there is a correlation between the type of university or nationality and entrance or regular exam results. In this article, I will focus on a correlation between both English exam results and successful studies at the University of Economics in Prague.

For the purposes of our survey, we formulated the following hypothesis: Students with good English entrance exam results have good English entrance exam results.

- H1: For the applicants with Czech nationality;
- H2: For the applicants with Russian nationality;
- H3: For the applicants with Slovakia nationality;
- H4: For the applicants with Vietnam nationality.

We also analyzed a correlation between both English exam results, using a classification similar to that of the above mentioned hypotheses but referred to as C1-C4.

MATERIAL AND METHODS (DATA COLLECTION)

The central data systems of the UEP were our basic source of data. These systems contain data about all applicants as well as about the study results of all applicants who then became UE students.

In this article, we analyze in detail only a data group showing English entrance exam results and Standard English exam results, compare these results and try to find the answer to the question whether or not there is any correlation between entrance exam results. We also perform the analysis with respect to individual faculties contained in the data file.

Each faculty of the UEP has its own entrance exam procedure and can choose how it will be carried out or may even remove it. The following two basic approaches are used at the University of Economics in Prague:

Students are accepted based on the entrance exam (or the entrance exam may be removed in view of high school grades);

Students are accepted based on the SCIO test results (national knowledge test realized among high school graduates).

Two faculties of the UEP (the Faculty of Economics and the Faculty of Management) are not included in the analysis due to the unavailability of data.

The Czech Republic passed Act No. 101/2000, on the protection of personal data. Therefore, we anonymized all processed data at multiple levels. We anonymized all information that could lead to the identification of a specific student. We removed the information about an applicant's first and last name, birth certificate number and identifier in the study information system. None of the additional information obtained from primary systems made it possible to identify an applicant or student.

General Data Characteristics

The data file with entrance exams currently includes 103,829 records that we have been collecting since the year 2010. Each record provides information about the admission procedure result of one student. If a student took the entrance exam in several years or filed several applications to the UEP, he is then included in the data file several times. The most key attributes in the data file include gender, field of study, faculty, type of study, entrance exam result and information about whether or not a student passed the entrance exam and was accepted.

RESULTS AND DISCUSSION

We mentioned in the introduction and the problem formulation that we would analyze a correlation between standard English exam results and English entrance exam results. We also defined several hypotheses that apply to these two subject-matters in the entrance exam.

This part is divided into description of mathematics entrance exam results and English entrance exam results, analysis of a correlation between mathematics entrance exam results and English entrance exam results by faculty, refutation of the formulated hypotheses.

The first table provides overall information about structure of applicants that are passing an entrance exam from English. As we see share of students with Czech nationality, which are passing an entrance exam from English is decreasing and share of the group "other" is increasing. This is caused by two factor:

Increasing number of students with non-Czech nationality

Increasing number of students with Czech nationality that are passing an entrance exam from different languages.

Above mentioned suggestions are confirmed by the numbers in table 2.

Table 1. Applicants for study based on their nationalities, Source: authors

Nationality	2010	2011	2012	2013	2014
Czech	83,33%	82,46%	80,38%	83,02%	68,26%
Russia	2,35%	2,17%	3,52%	2,49%	4,93%
Slovakia	10,85%	10,81%	12,47%	9,74%	8,32%
Vietnam	0,80%	1,32%	1,09%	1,26%	2,31%
Others	2,67%	3,24%	2,54%	3,49%	16,8%

The table 2 provides standard statistical characteristics of the population passing an entrance exam from English between years 2010-2014. We see that total number of applicants is decreasing.

Table 2. Results of Entrance Exams, Source: authors

Year	n	mean	sd	median	range	skewness	kurtosis
2010	293	79,0	11,7	80,00	92,2	-	1,19
2011	256	75,0	16,9	78,00	87,0	-	1,84
2012	226	78,1	12,4	80,00	70,0	-	0,43
2013	194	77,6	12,3	80,00	90,0	-	1,11
2014	182	80,2	9,93	80,00	34,0	0,27	-0,96

Table three provides information about number of student that pass standard exam from English in defined year. This table provides also overall information about whole data sample. We see that number of students is decreasing in each of analyzed years. This is caused by the definition of the study programs. Every students can pass standard exam from English anytime between the first and the third year of his study. In general we can say that results are relatively stable in time. The mean value is between 2,4 and 2,1. The year 2013 is quite interesting because the mean value is usually decreasing in time. This is caused by the fact that the best students pass exams earlier than the others.

Table 3. Results of Study Exams, Source: authors

Year	n	mean	sd	median	skewness	kurtosis
2010	3149	2,31	0,81	2	0,24	-0,41
2011	2664	2,21	0,81	2	0,20	-0,50
2012	2357	2,16	0,81	2	0,39	-0,23
2013	1061	2,43	0,84	2	0,15	-0,56
2014	29	2,10	0,82	2	0,20	-0,80

Very important and interesting is following table (Table 4). This table compares results from entrance examination from English (rows) and results from standard exam from English (columns). We have to unified both data samples to be able to compare it and we use method as follows. Results from standard exams are defined as A, B, C etc. These values can be defined as follows:

A: 90-100% points from the subject,

B: 75-89% points from the subject,

C: 60-74% points from the subject,

D: less than 59% points from the subject,

NA: students that pass standard exam from English but did not pass entrance exam from English because they have entrance exams from different language or student that not yet pass standard exam at all

Table provides expected results. Applicant that have better results from entrance exams usually have also better results from standard exams. For example if students got more than 90 point from entrance exams then in 40% of cases got A from standard English exam.

Table 4. Comparison Entrance Exams / Study Exams, Source: authors

points/grades	A	B	C	D	NA	sum
90 - 100	39,99%	20,65%	6,17%	3,90%	7,58%	16,93%
75 - 89	35,12%	44,09%	30,69%	17,78%	22,39%	34,71%
60 - 74	4,99%	16,96%	27,87%	34,95%	27,79%	20,60%
< 59	1,86%	3,46%	9,59%	19,19%	17,84%	7,82%
NA	18,04%	14,85%	25,69%	24,18%	24,39%	19,94%
sum	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

The correlations described in Table 5 tells us that there is medium negative correlation almost in all years. We can say that based on the calculation of correlation coefficient there is only small/medium dependency between results from entrance examination and results from standard exams. The year 2014 does not contain values for nationalities Slovakia and Vietnam. This is caused by the not availability of the data. Students don't have to fulfill these exams in the same year and can happened that they will pass this exams in the next year/yers.

Table 5. Correlation – Nationalities, years, Source: authors

Year	All	Czech	Slovakia	Russia	Vietnam
2010	-0,440	-0,452	-0,417	-0,385	-0,364
2011	-0,364	-0,357	-0,422	-0,310	-0,330
2012	-0,506	-0,506	-0,515	-0,422	-0,575
2013	-0,365	-0,390	-0,409	-0,392	-0,140
2014	-0,429	-0,647	NA	-0,500	NA

Very interesting information is provided by the following Fig 1. This figure provides information about histograms of points and grades from entrance exams and from standard exam. These histograms are prepared for all analyzed nationalities.

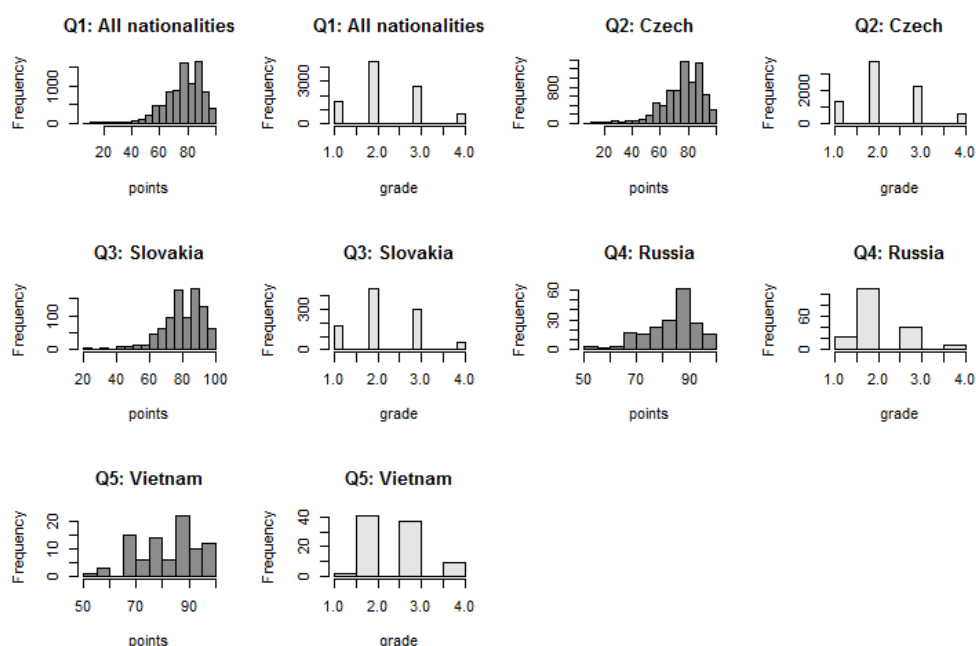


Fig. 1. Histograms of points/grades from entrance exams and standard exams, Source: authors

CONCLUSION

We analyzed the data obtained from the entrance exams to the University of Economics in Prague. Our goal was to analyze the number of points in entrance exam and standard exam in English achieved by the students. Based on the performed analysis of the both exams from English, we reached the following conclusions: The number of points in English achieved by applicants from entrance exams are dropping with time, and this drop is permanent and significant and represents three points each year on average. The correlation analysis has proven a medium to medium strong negative correlation between English entrance exam results and English standard exam results with respect to all faculties of the University of Economics that were analyzed.

Based on the hypothesis analysis using the F-test and the T-test, we found out that all null hypotheses formulated in the introduction of this article were rejected.

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References

- Psacharopoulos, G. (1995). The Profitability of Investment in Education: Concepts and Methods. December 1995. [cit. 2013-02-15]. URL: <<http://www.c3l.uni-oldenburg.de/cde/econ/readings/psacharo.pdf>>.
- Scholleova, H., Mikovcova, H. (2011). Perspectives of economic education in the Czech Republic. SCIENTIFIC PROCEEDINGS, 2011, roč. 19, č. 2, s. 899–905. ISSN 1313-7123.
- Ala-Mutka, K., Punie, Y., Redecker, Ch., (2008). ICT for Learning, Innovation and Creativity. European commission, URL: <http://ftp.jrc.es/EURdoc/JRC48707.TN.pdf>.
- Maryska, M., Doucek, P. (2011). Comparison of the Czech and Austria Education Systems. Jindřichuv Hradec 07.09.2011 – 09.09.2011. In: IDIMT-2011. Linz : Trauner Verlag universitat, 2011, s. 23–34. ISBN 978-3-85499-873-0. WOS:000299185000002
- Kunstova, R., Řezankova, H. (2012) Evaluation of Economic Education from Graduates' Point of View. Statistika 2012, roč. 49, č. 1, s. 31–40. ISSN 0322-788X. ISSN 1804-8765 online.
- Polackova, J., Svatosova, L. (2013) 'Analysis of success in university study as connected to admission exam results' In: 10th International Conference on Efficiency and Responsibility in Education (ERIE 2013), Prague, pp. 503-509. ISBN 978-80-213-2378-0
- Fischer, J., Finardi, S. (2010). Czech tertiary education on the way to competitiveness. Jindřichův Hradec 08.09.2010 – 10.09.2010. In: IDIMT-2010 Information Technology – Human Values, Innovation and Economy. Linz : Trauner, 2010, s. 231–236. ISBN 978-3-85499-760-3. WOS:000288345500024
- Smutny, Z., Nedomova, L., Mikovcova, H. Knowledge Analysis of Registered Students for Combined and Full-Time Study at The University of Economics, Prague. In: Efficiency and Responsibility in Education (ERiE). Praha, 05.06.2014 – 06.06.2014. Praha : Czech University of Life Sciences Prague, 2014, s. 751–758. ISBN 978-80-213-2468-8
- Fiala, T., Langhamrová, J. (2009) Human resources in the Czech republic 50 years ago and 50 years after. Jindřichův Hradec 09.08.2009 – 11.08.2009. In: IDIMT-2009 System and Humans – A Complex Relationship. Linz : Trauner Verlag universitat, 2009, pp. 105–114. ISBN 978-3-85499-624-

Does It Matter? Tweeting In A Research Methodology Class

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ABSTRACT

The use of the ubiquitous social medium, Twitter, has been extended to the classrooms as a pedagogical tool. Many studies have recorded positive correlations between the use of Twitter and learners' motivation, engagement and learning. Past studies have also reported the positive function of Twitter in advancing collaborative learning and collegial discussions on subject matters. This small-scale study, which adopted a mixed method approach, reports students' perceptions on the use of Twitter in a Research Methodology (in Literature) class and students' uses of Twitter as a tool for learning. Data gathered through analyses of students' tweets and a survey questionnaire administered found that 1) students showed mixed responses to the use of Twitter in the classroom and that 2) students used Twitter 'superficially', generally as a platform for sharing ideas, clarifying confusions, helping and motivating each other. It was also found that the nature of the course and technical limitations experienced by students had an impact on their perceptions of the use of Twitter in their Research Methodology classroom. Suggestions are offered for future applications of Twitter in the classroom.

INTRODUCTION

Teaching a research methodology class (in Literature) is a daunting task to many instructors, considering research methodology is a field that the "academic community itself has no uniform conception of" (Lehti and Lehtinen, 2005) and students often come to class with a less-than-positive attitude towards the idea of research. Research methodology instructors therefore face the challenge of not only making students understand and apply research principles and processes but also motivating students, by and large known as "Generation Y", "digital natives" (Prensky, 2001) and "Net generation" (Tapscott, 1998) who are generally more obsessed with ubiquitous Web 2.0 technologies than what takes place in the classroom.

Such technologies refer to web-based technologies with which users can contribute to and consume content on the Internet. Other than this feature, Web 2.0 technologies also enable social communication and interaction among users. Today, Web 2.0 tools (often used interchangeably with the term social media) such as Facebook, Twitter, Youtube, Flickr, Tumblr, and Pinterest continue to flourish. Efforts have been made by teachers to integrate them in classroom practice. Indeed, research on the use of Web 2.0 technologies have been under way, with researchers reporting on its potential to have a large impact over the coming five years in education around the globe (Johnson, Baker, Estrada & Freeman, 2014), proliferating to become a new literacy practice (Greenhow, 2012). Moreover, recent research have also discussed the usefulness of Web 2.0 as a tool which promote independence in students' study and research (Crook, 2008), increase students' engagement (Park, 2013), promote active learning (Lee, 2011) and enhance group communication (Wang & Hsu, 2008; Cole, 2009; McLoughlin & Lee, 2008).

Web 2.0 technologies also consist of social media technology, made up of social networking websites (SNSs) such as Facebook and Twitter. Considered as less formal than other media, educators have been using them as part of their professional communities of practice, as learning communities, and as a platform to share interesting stories about topics students are studying in class. Feliz, Ricoy & Feliz (2014) however, have argued that existing studies on this subject are not sufficiently conclusive, implying that understanding how social media technology can be leveraged for learning is crucial.

Research on the use of Twitter outside the field of education has emphasized its communicative, informational, and organizational properties such as helping to develop and maintain relationships through conversation (Marwick and Boyd, 2011), to gather and disseminate information (Kwak, Lee, Park & Moon, 2010), and to mobilize protest (Howard et al., as cited in Greenhow, 2012). The use of Twitter has been extended to the classroom as a pedagogical tool. Many studies have recorded positive correlations between the use of Twitter and learners' motivation, engagement and learning (Feliz, Ricoy & Feliz, 2013; Park, 2013; Junco, Heiberger & Loken, 2010). Past studies have also reported the positive function of Twitter in advancing collaborative learning and collegial discussions on subject matters (Elavsky, Mislán & Elavsky, 2011; Rinaldo, Tapp & Laverie, 2011). A form of microblogging, Twitter allows its users to create their own content, tag it and share it. Due to its unique, brief text update of 140 characters, Twitter lessens users' requirement of time and thought investment in order to generate content. In addition, it also enables users to update frequently. With more than 3.5 million users sending out roughly more than 5.4 million tweets per day (Sakawee, 2014), Twitter has experienced

substantial growth in Malaysia since it was introduced in 2006. Research on Twitter's use in education in Malaysia however, is scant even though education-related Twitter accounts such as Malaysian Edu Hub, My Mentor Study in Malaysia and Teach for Malaysia are plenty. One research that investigated the use of Twitter for post-reading activities among Malaysian community colleges reported a low level of Twitter usages among teachers and students, implying a bleak future for the use of this technology in Malaysian classrooms (Hamidon et al., 2013). In order to understand the potential of Twitter in the higher education context in Malaysia, more studies are needed.

THE STUDY

This study was implemented over a period of fourteen weeks (one semester) in the course entitled Research Methods in Literature, taught as part of an English literature degree programme at Universiti Putra Malaysia, Malaysia, and enrolled 29 students. The course covers the content, form, and style of academic papers in literature, including basic research strategies using both text and electronic sources directly applicable to literary studies. At the end of the course, students were expected to be able to compose bibliographic research relevant to literary topics, write and present a research proposal. The main reason for the adoption of Twitter in the RM classroom is to extend their learning of research methods in Literature and to provide support for their research project.

This study employed a mixed-method approach to investigate the potential use of Twitter in order to assist students in developing their research skills. Exploratory in nature and design, this study commenced from the recognition of the inherent advantages, limitations and unpredictability in using Twitter in educational settings. Three research questions guided the study: 1) Is the use of Twitter effective in generating responses from students? 2) What kinds of responses are elicited through Twitter? 3) What are the students' perceptions of the use of Twitter in the Research Methodology classroom?

At the beginning of the semester, the students were asked to create a Twitter account and submit their ID to the course instructor. 15 students had already had their own Twitter accounts for one year and more. These students cited personal reasons for using Twitter such as using Twitter to present information on their interests, to connect with persons who share some of their values, to get enjoyment, and to get entertainment. However, only 5 of them logged in to their accounts frequently, more than once per day.

For this course, all 29 students were asked to create a new account only accessible to the instructor and those registered for the course. Most students had laptops and smart phones, so they could send their posts (tweets) on Twitter anytime, anywhere, and not necessarily in class. Twitter use (posting and responding to tweets) was made compulsory at least twice a week. They were asked to respond to the teacher's weekly prompt. The prompts varied in terms of purpose but mainly they were intended to 1) check students' understanding of lessons learnt e.g. *Have you been explicating or analysing texts? #Week8* 2) check students' research progress e.g. *A certain theory suits a certain text better". What theory have you chosen for your proposed text(s) and why? #Week10* 3) check their perceptions of classroom activities e.g. *How do you find Refworks? #Week4*. Other than these prompts, the teacher also sent tweets to motivate her students in the research process e.g. *You still have time to decide on a problem area! But soon you have to decide. Do not wait until the last week of the semester, though! #Week2*. In addition, they were also encouraged to tweet anything that is related to the course and their impending research project.

This study relied on two types of analysis. To identify the types of students' response, a qualitative content analysis of students' posts was carried out. This involved a close and careful reading of the students' posts by two raters, who then coded the responses and categorised them into different themes. To find out students' perceptions regarding the use of Twitter, a structured, Likert-scale questionnaire was used. The questionnaire comprised 33 questions that measure important aspects of the students' experiences in using Twitter. Items are measured on a five-point scale, indicating the amount of agreement or disagreement, ranging from strongly disagree (1) to strongly agree (5).

FINDINGS AND DISCUSSION

At the end of the semester, a total of 575 tweets had been posted in relation to the course (excluding the teacher's). On average, about 40 tweets were sent out per week throughout the semester, and each student tweeted about 20 times throughout the semester. These numbers were not encouraging considering each student was expected to post at least 58 tweets throughout the semester (2 posts per week), contributing a total of 1,682 posts. When asked how many times they checked their Twitter account throughout the semester, about 60 percent answered they seldom did. About 28 percent replied they either checked their accounts once a week or more than twice a week.

Analysis One: Response Coding

Based on the qualitative analyses of students' responses, 14 categories of posts were identified. Table 1 represents the types of responses elicited from the students' posts.

Table 1: Types of Students' Posts

Type of posts	Example	No. of responses	Percentage
1. Answer prompt by instructor	Teacher: <i>Have you thought of a research topic? #Week2</i> Student1: <i>What's exactly on my mind right now: The Color Purple-The Bluest Eye-Psychoanalytical criticism.</i>	104	18.08
2. Retweet/Favourite		14	2.43
3. Share thoughts about own research	Student2: <i>I'm just thinking of doing a comparison between Sing to the Dawn and Girl from the Coast.</i>	42	7.30
4. Ask info/clarification (general)	Student3: <i>Do we use the feminist criticism if we're looking into oppression/exploitation of children/young adult?</i>	21	3.65
5. Ask info/clarification (teacher)	Student3: <i>@Teacher Is there an angle I can delve into regarding the characters' voices? The silenced and the silencer?</i>	25	4.35
6. Ask info/clarification (friend)	Student4: <i>@Student5 So u r using what lens? I'm using the feminist lens.</i>	4	0.70
7. Share info (link/visual/tweet)		9	1.57
8. Give opinion on friend's tweet/question	Student6: <i>Anyone knows the format to omit letter from a word? example: 'safer' change to 'safe' #Week12</i> Student5: <i>@Student6 Change the whole word by using [] I think.</i>	42	7.30
9. Thanking teacher/friend for their opinion/help	Student7: <i>@Student3 I'm probably in the right path then. Lol. Thank u @Student3!</i>	20	3.48
10. Summarize week's lesson	Student8: <i>#Week5 We will not get anything by plagiarism. It shows that you only know how take other's, rather than produce yours. :)</i>	49	8.52
11. Divert from prompt	Teacher: <i>Have you thought of a research topic?</i> Student9: <i>I'm always contemplating on the subject, was Shakespeare real?</i>	3	0.52
12. Responding to teacher's feedback	Student10: <i>@Teacher Yes! It's getting clearer! & it helps us to accomplish our lit rev. Thanks for being patient and teaching us from A-Z #Week7</i>	125	21.73
13. Responding to friend's feedback	Student11: <i>@Student12 Apparently there's a handful of us interested in the same topic, haha.</i>	77	13.39
14. Miscellaneous	Student13: <i>Tbh, I am disappointed with myself. Rip my literature and gender assignment. Working hard on research method. Allah ease.</i>	40	6.96
Total		575	100

The distribution of percentages indicates that the students' responses were distributed unevenly across the fourteen categories, suggesting that Twitter allows students more scope in expressing their responses to the course. This uneven distribution was somewhat predicted considering this was the students' first experience in using Twitter as part of their coursework. About 18 percent of the posts were answers to the teacher's prompt, 22 percent were responses to teacher's feedback and 13 percent were responses to friend's feedback. This finding correlates with the reasons they checked on their use of their Twitter account. 62 percent of the students strongly agreed they logged in to their Twitter accounts to check the teacher's prompt and their classmates' responses. 69 percent strongly agreed they logged in to respond to the teacher's prompt.

Types of students' responses were generally divided into two categories: 1) responses to teacher 2) responses to each other. Students' responses to the teacher were often triggered by the teacher's prompts and these responses can be further subcategorized into 1) sharing progress of research 2) sharing feelings about research 3) sharing research experience. Students also sought clarifications, information and confirmation from the teacher relating

to their research. Even though students shared information about their research when they responded to the teacher's prompt, most of the time information that they shared was superficial: brief and no further explanation was given. The following threads illustrate this superficiality:

Thread1:

Teacher: *How is your research proposal coming along? 5 weeks left before you submit. Oops. Hehe. #Week9*

Student14: *@Teacher So far so good, Miss.*

Student15: *@Teacher It's time to start drafting! Hehe.*

Student5: *@Teacher Gonna start to think and work hard on it now.*

Student13: *@Teacher Intensive readings with an intensive face...*

Thread2:

Teacher: *A certain theory suits a certain text better". What theory have you chosen for your proposed text(s) and why? #Week10*

Student16: *@Teacher Writers often address an issue in their writing, however some writers let d readers decide d approach/theory #Week10.*

Teacher: *@Student16 So what have you decided on?*

*No answer from Student16

Analyses of the students' posts to each other show that they 1) shared knowledge about research 2) helped each other in research and 3) motivated each other. Sharing knowledge about research and helping each other in research also seem superficial since most of the time the students concentrated more on motivating each other rather than sharing knowledge and helping each other. The following thread illustrates this superficiality:

Thread3:

Student13: *@Teacher I like Proquest and Purdue Owl. Sometimes I just read other people's paper works to get ideas.*

Student15: *@Teacher I would do the same thing as @Student13 does. I would go through Proquest website to read journal or article.*

Student13: *@Student15 Same with me!*

This shows that Twitter has become more of a social support group rather than as a learning support. The rather large percentage of responses involving responding and communicating with the teacher (answering to teacher's prompt and feedback) could suggest students saw the teacher as the main source of information and initiator inside and outside the classroom. In addition, the students could have felt compelled to respond to the teacher and their course mates to show their participation in Twitter.

Sharing thoughts about own research, giving opinion on friend's tweet/question, summarizing week's lesson and asking for information/clarification share about the same percentage each, contributing to about 30 percent of total tweets. This finding suggests that the students use Twitter generally as a platform for sharing ideas about research and clarifying confusions. This is largely inconsistent with the findings of Crook's research which has found that Twitter did not make students independent (2008). In the context of this study, the students were not independent because their in-depth contribution and sharing of knowledge and research process were lacking.

Analysis Two: Students' Perception

The value of Cronbach's Alpha based on the 33 items in the questionnaire is 0.743 (moderately acceptable) indicating a relatively stable index of students' perceptions of using Twitter. Table 2 presents the items along with the percentages (1 = strongly disagree, 5 = strongly agree).

Table 2: Students' perception of using Twitter (in percentage)

Item	1 SD	2 D	3 MA	4 A	5 SA
1. Twitter is fun as a coursework	6.9	34.5	41.4	10.3	6.9
2. Twitter provides a new experience in learning	3.4	17.2	37.9	20.7	20.7
3. I use Twitter because it is part of my coursework	0	13.8	27.6	24.1	34.5
4. Twitter extends what I have learnt in class	3.4	24.1	37.9	34.5	0
5. Using Twitter is a hassle	13.8	13.8	34.5	24.1	13.8
6. Twitter helps me to communicate with the teacher outside class	3.4	6.9	20.7	41.4	27.6
7. Twitter helps me clarify topics or concepts that I do not understand in class	3.4	6.9	37.9	27.6	6.9
8. Twitter helps me to communicate with my classmates outside class	10.3	13.8	37.9	27.6	6.9
9. Twitter helps me to record my concerns with my research	3.4	13.8	37.9	34.5	10.3
10. Twitter helps me to be active in learning	3.4	17.2	48.3	20.7	10.3
11. Twitter is more suitable for social networking and not for learning	3.4	20.7	20.7	31.0	20.7
12. Allocating 15% of total evaluation to Twitter is too much	6.9	6.9	20.7	31.0	34.5
13. I would not use Twitter if it is not part of the coursework	10.3	6.9	20.7	20.7	41.4
14. Twitter is a faster mode of classroom communication	13.8	10.3	48.3	24.1	3.4
15. Messages on Twitter motivate me to do better in the course	13.8	10.3	51.7	20.7	3.4
16. Twitter should be part of the coursework for future Research Methods classes	17.2	27.6	31.0	13.8	10.3
17. I prefer face-to-face consultation than sharing my concerns on Twitter	6.9	34.5	27.6	31.0	0
18. Twitter gives me the freedom to share my thoughts when and where I feel like it	10.3	10.3	34.5	31.0	13.8
19. Using Twitter is a waste of time	6.9	37.9	34.5	6.9	13.8
20. I learnt a lot of things about research through Twitter	17.2	31.0	31.0	17.2	3.4
21. I prefer to consult the teacher using Twitter rather than face-to-face	17.2	31.0	31.0	13.8	6.9
22. I feel uncomfortable sharing my concerns on Twitter because people will know my problem	20.7	27.6	27.6	13.8	10.3
23. Using Twitter is the easiest and most cost-effective way to discuss research processes.	13.8	24.1	37.9	17.2	6.9
24. Twitter lets me express myself which I find hard to do in the classroom	6.9	17.2	44.8	20.7	10.3
25. Twitter's 140-character limitation is a bother.	6.9	6.9	24.1	6.9	55.2
26. I would not use Twitter if there are no marks allocation	6.9	3.4	55.2	10.3	24.1
27. I feel more engaged with the course through Twitter	13.8	24.1	44.8	6.9	6.9
28. I learnt to be precise in expressing my thoughts using Twitter	6.9	13.8	44.8	20.7	13.8
29. I don't find the use of Twitter beneficial to my learning	10.3	20.7	44.8	13.8	10.3
30. Twitter helps to alleviate my worries concerning my research	6.9	20.7	55.2	10.3	6.9
31. Twitter makes my learning more collaborative	10.3	24.1	28.3	6.9	10.3
32. Without Twitter, I would feel 'alone' in the course	37.9	27.6	27.6	0	6.9
33. Twitter provides me with valuable support in learning	6.9	17.2	51.7	13.8	10.3

Based on the findings, it can be concluded that students generally had mixed responses to Twitter in the Research Methodology classroom. Generally, they perceived Twitter as having some form of value to support their learning in terms of seeking clarification, sharing support, motivating each other, and communicating with the teacher. However, it is shown that students generally had a negative perception towards Twitter itself. About 60 percent of the students agreed that they would not have used Twitter if it was not part of the coursework, and that allocating 15 percent of the total evaluation to Twitter was too much. Based on students' responses to the open-ended questions in the questionnaire, it was also revealed that most of the students did not favour Twitter as a technology tool that promotes better learning.

When asked about which application they thought was better than Twitter, 19 out of the 29 students said they preferred Facebook; citing reasons of familiarity such as everybody had a Facebook account and was active, and that Facebook was more popular than Twitter. Another reason given is that Facebook would allow them to write longer, different from the nature of Twitter itself which had a different interface and character limit. This

preference explains why 60 percent of the students agreed that Twitter's 140-character limitation was a problem for them. What added to the students' frustration were the challenging issues with limited mobile data and Wi-Fi connection in hostels and in the classroom.

The results above suggest that students have mixed responses to the use of Twitter in the classroom as they found it useful as a platform to communicate with the teacher and their classmates, sharing thoughts about own research, giving opinion on friend's tweet/question, summarizing week's lesson and asking for information/clarification. One other main hindrance to adopting Twitter in the Research Methodology class is the nature of the course itself - the main bulk of the course evaluation came from presenting and writing a research proposal – most of them did not really have a clear idea about their research until towards the end of the course itself. This was observed when students presented their research proposals at the end of the course. This perhaps explains their superficial Twitter postings about their research and general research processes. Other equally important reasons are the popularity of Facebook and the students' familiarity with it, affirming Rinaldo's finding that student resistance to using Twitter is a primary barrier to student adoption (2011).

IMPLICATION AND SUGGESTIONS FOR FUTURE RESEARCH

The use of Web 2.0 technologies such as Twitter can be a hindrance in learning. The findings from this study suggests that the adoption of Twitter in the classroom is 1) interconnected with students' preference of certain tools, 2) dependent on the nature of the tool itself. In Twitter's case for example, the 140-character limit serves as a barrier to the students, limiting their writings/responses. It is therefore important for teachers to carry out a survey on students' preference before adopting Twitter or any Web 2.0 technologies in class. Perhaps it would also be beneficial if the teacher could schedule tweeting time in class, and hold a short discussion based on responses on Twitter.

CONCLUSION

Introducing Twitter in a Research Methodology class may sound like a novel idea as Twitter as a social media technology has the potential to engage students, increase the interaction between teacher and students, and provide social and emotional support. This research shows that even though the adoption of Twitter as a learning tool provided some form of support to the students, it did not extend students' learning of Research Methods (in Literature). This is due to various factors relating to students' preference, nature of the course and inadequate infrastructure. These findings show that the use of Twitter in the RM classroom could perhaps matter when students associate positive feelings to the use of it. Until then, a future for the use of this technology in the Research Methodology class remains to be seen.

References

- Cole, M. (2009). Using Wiki technology to support student engagement: Lessons from the trenches. *Computers & Education*, 52(1), 141-146.
- Crook, C. (2008). Web 2.0 technologies for learning: The current landscape – Opportunities, challenges and tensions. Retrieved 20 May 2015, from <http://dera.ioe.ac.uk/1474/>
- Elavsky, C. M., Mislán, C., & Elavsky, S. (2011). When talking less is more: exploring outcomes of Twitter usage in the large lecture hall. *Learning, Media and Technology*, 36(3), 215-233. doi: 10.1080/17439884.2010.549828
- Feliz, T., Ricoy, C., & Feliz, S. (2014). Analysis of the use of Twitter as a learning strategy in master's studies. *Open Learning: The Journal of Open, Distance and e-Learning*, 28(3), 201-215. doi: 10.1080/02680513.2013.870029.
- Greenhow, C., & Gleason, B. (2012). Twitteracy: Tweeting as a new literacy practice. *The Educational Forum*, 76, 463-477. doi: 10.1080/00131725.2012.709032
- Hamidon, I. S., Alias, N., Siraj, S., Kokila, K., Mohammed, M., & Thanabalana, T. V. (2013). Potential of Twitter in post-reading activities among community college students in Malaysia. *Procedia - Social and Behavioral Sciences*, 103, 725-734.
- Johnson, L., Adams Becker, S., Estrada, S., & Freeman, A. (2014). *NMC Horizon Report: 2014 Higher Education*. Austin, Texas: The New Media Consortium.
- Junco, R., Heiberger, G., & Loken, E. (2010). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, 27, 119-132. <http://dx.doi.org/10.1111/j.1365-2729.2010.00387.x>
- Kwak, H., Lee, C., Park, H., & Moon, S. (2010). *What is Twitter, a social network or a news media?* Paper presented at the International World Wide Web conference, Raleigh, NC.
- Lee, E. (2011). Facilitating student-generated content using Web 2.0 technologies. *Educational Technology*, 51(4), 36-40.
- Lehti, S., & Lehtinen, E. (2005). Computer-supported problem-based learning in the research methodology domain. *Scandinavian Journal of Educational Research*, 49(3), 297-324. doi: 10.1080/00313830500109618.

- Marwick, A., & Boyd, D. (2011). I tweet honestly, I tweet passionately: Twitter users, context collapse, and the imagined audience. *New Media and Society* 13(1), 114-133.
- McLoughlin, C., & Lee, M. J. W. (2008). The three p's of pedagogy for the networked society: Personalization, participation, and productivity. *International Journal of Teaching and Learning in Higher Education*, 20(1), 10-27.
- Park, S. W. (2013). The Potential of Web 2.0 tools to promote reading engagement in a General Education course. *TechTrends*, 57(2), 46-53.
- Prensky, M. (2001). Digital natives, digital immigrants Part 1. *On the Horizon*, 9(5), 1-6.
- Rinaldo, S. B., Tapp, S., & Laverie, D. A. (2011). Learning by Tweeting: Using Twitter as a pedagogical tool. *Journal of Marketing Education*, XX(X), 1-11.
- Sakawee, S. (2014). Here's data on Malaysia's twitter population, where they tweet, and who they follow. Retrieved 29 May 2015, from <https://www.techinasia.com/heres-data-malaysias-twitter-population-tweet-follow-infographic/>
- Tapscott, D. (1998). *Growing up digital: The rise of the net generation*. New York, NY: McGraw Hill.
- Wang, S. K., & Hsu, H. Y. (2008). Reflections on using blogs to expand in-class. *TechTrends*, 52(3), 81-85.

Education For Health In Moroccan Adolescent Living In The Spanish Southeast: Analysis Of Assets In Health

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ABSTRACT

Education for Health is a multidimensional process of communication and social and educational intervention, and is influenced by social, cultural and anthropological factors. It aims to enhance the ability to detect and integrate resources, customs, cultural and environmental elements, existing in the communities of life and enhancing the health of people living in them.

Objective: The objective is to determine the assets in health posed by Moroccan adolescents, living in the province of Almeria, before initiating a development of a program of health promotion.

Method: Qualitative research in which health assets of students are identified through the analysis of the content of the interviews and photographs provided by the fifteen Moroccan participants. For the discourse analysis was used ATLAS.ti 7.1.8.

Results: The results highlight the ease of Moroccan teenagers for organizing support networking with peers from different cultures. Preference for leisure activities related to the practice of sports (for men). The motivation to take advantage of the migration project as a resource for achieving the greatest professional success and interest for the health and its maintenance. Students establish a direct relationship between healthy behaviors and Moroccan cultural patterns.

Conclusion: Moroccan adolescents have a number of specific assets in health, not only in relation to the dominant cultural group but even to their own parents, due to acculturation processes as they have been linked with the Spanish culture differently from their parents.

Funding: This study is part of the project “Education for Cross-cultural Health in Immigrant and Native Adolescents from Almeria: Analysis and intervention for optimization and improvement” supported by the National R+D Plan of the Ministry of Economy and Finance (Ref: EDU2011-26887)

INTRODUCTION

Health Education can be defined in an eclectic manner as a multidimensional social and educational intervention and communication process that aims to train and render accountable people in health-related decision-making processes. Depending on the method used, the underlying ideology and the objectives pursued, different ways of guiding Health Education activities can be envisaged (Aibar, 2010). Other definitions of this concept refer to optimization; improvements of the human being addressed to the individual's well-being as one of its essential features. Some views go beyond this point and argue that health is a high priority in the list of elements to achieve happiness and it is important for both mental and spiritual well-being as it constitutes one of the key factors for happiness. Health Education shall be, in this regard, a case in which the issue of this optimization becomes reality through the exercise and desire to implement healthy changes in the individual's behavior, regardless of its geographic location. The aim is to, ultimately, improve the quality of human health which, in turn, is an important objective shared by most cultures (Bouché Peris, 2004).

It is also important to take into consideration the strong influence that social, cultural and anthropological factors have on Health Education (such as public opinion, fashion, advertising, values, beliefs, customs, etc.) which justify its perception as a social intervention process. As an educational process it requires explicit educational objectives adapted to the characteristics of the target population and the use of teaching resources to promote their participation (Aibar, 2010). The objectives of the Health Education and Promotion research not only focus on identifying the associations between social and individual risk factors and health or disease. They should primarily be aimed at:

establishing how these factors act,
what protection mechanisms do people possess or develop,
which are their environmental aspects that facilitate or hinder such mechanisms,
which are the healthiest social environment features and how can they be created and maintained, and finally,
what can individuals, communities, technicians and politicians do to control them.

Consequently, this research shall have to be contextual, address the inequalities, be dynamic, participatory, multidisciplinary and a results-oriented health development and understand the changes, be flexible in its

methodological aspects and produce useful results that could be shared with all stakeholders involved. (Colomer and Peiró, 2010).

Hernán et al (2013) argue that the prevention-oriented public health approach is a shift towards a positive public health. The traditional trend, focused on the protection, prevention and emphasis on reducing risk factors or creating barriers to diseases is being re-directed towards a perception of health actions that focuses on the biopsychosocial dimension. As Perea outlined in 2004, there is currently a new health culture that conceives the individual from a holistic perspective; a socioeconomic, psychosocial, environmental, ethnic, etc. human reality that is intertwined with the biological reality - ecological, so the concept of health adopts a holistic sense, a concept that encompasses man as a microcosm within a cosmos. Health Education shall now be focused on improving the quality of human life and, for this reason, it manifests a positive sense of support and empowerment of individuals to manage their own health by promoting proper environmental and behavioral changes that will lead to healthier lifestyles.

Each community has different talents, skills, interests and experiences that are valuable for health. We need to implement methodologies that emphasize the development of policies and practices based on the abilities, skills and resources of the individuals and communities in our cities, towns and neighborhoods. This would allow us to, as observed in many of our public health programs and health promotion, discover the individual, collective and environmental resources. The challenge now is to enhance the ability to collaborate and identify the existing resources, customs and cultural and environmental elements in the communities and the people within them and establish a better connection between our knowledge and skills with citizens and institutions to respond to the needs and interests of individuals throughout the course of their lives. (Hernán, M. et al, 2013).

As already indicated by Antonovsky in 1996, the health behaviors of individuals involve the following:

1. An understanding of the situation,
2. the vision of their own abilities to manage them and
3. the ability to transform what is done into satisfactory actions that are also meaningful to life.

and from this perspective, authors such as Morgan et al (2007) defined:

"A health asset is any factor or resource that enhances the capacity of individuals, communities and the population to maintain health and well-being."

Kretzman & McKnight already in 1993 pointed out that a method was necessary in order to attempt to identify the assets or strengths of the community to discover the existing individual, collective and environmental skills and talents. It would be a different process from the practice of inventory and identification of the deficiencies of individuals and communities traditionally used in the health diagnosis process. This approach recognizes that each community has talents, skills, interests and experiences that are a valuable arsenal to be used. The asset map is part of not only individual but also group empowerment, training, participation and accountability process.

The aim of our study is to establish the health assets provided by Moroccan teenagers in the province of Almeria as a prior involvement in the development of a health promotion program. This analysis is part of the project: Transcultural Health Education for Immigrant and Local Youth from Almeria: Analysis and intervention for optimization and improvement, financed by the National R+D+I of the Ministry of Economy and Competitiveness (Ref: EDU2011-26887) of the research group HUM-665 at the University of Almeria.

METHODOLOGY

A descriptive-interpretative qualitative analysis of both the discourse and the images presented by fifteen participants selected through purposive sampling in Southeastern Spain. Our participants were 15 students of Moroccan origin, 7 of which were women and 8 men. The average age was 16 years and the average time of residence in Spain was 9 years.

Participants were provided a camera to take pictures that capture those images that they considered to be the most representative in relation to various aspects of their health. After analyzing the pictures interviews took place in which the photos were shown and they talked about the reasons for having taken them.

The reasons gathered in the semi-structured interviews were obtained during the first half of 2013, they were recorded in audio and transcribed. The qualitative analysis fitted our goal, which was not only to learn about the adolescents' health but also to provide a detailed account of the situation and resources. Therefore, it is clear that the generalization of the results is not the goal of the research. The software package ATLAS.ti 7.1.8 was used for the discourse analysis.

RESULTS

After repetitive discourse analysis, we identified several health assets among our participants in the external environment in the categories of support, security and respect, boundaries and expectations and constructive use of time.

• Support:

Within this area there are no significant difficulties in establishing relationships with peers from different cultures. However, when it comes to aspects regarding deep values they find it easier to interact with people from their cultural group, whilst at the family level, there is less reluctance to establish relationships with Moroccan adolescents than with those from other cultural backgrounds.

In my group of friends we are Moroccan, Spanish and even Guinean. But I only go to the homes of and go out with Moroccans and I only hang out with the rest in school. I can't, for example, go to a Spanish friend's house, they would only allow me to do so if they are a friend and they know her; but if they don't, if they do not know their parents then I can't. When it is a Moroccan girl even if they do not know her if I tell them that she's good girl and so on they do allow me to do so. With Guinean friends it is the same as with Spaniards. 425: 475 (ID, woman)

• Security and respect:

In the case of the girls the perception of insecurity in external environments where they fear for their safety and being judged for their identity and values as Moroccan woman is recurrent:

In relation to the environment sometimes I do not like it when there are many people around, when I go for walks sometimes I do not like it. Some are bad people and because I do not know the rest, my parents do not let me go out for a walk, I can only leave the house with my sister or my mother. If I want to go out alone in the end they let me do so but then people (also Moroccan) look at me as in I do not know... [...] they look at you differently. When most of them are Moroccan they look at you in disapproval and differently and I do not like it.... Especially in the evening and when there are many people around; in that case, I do not feel like going for a walk with so many people out. When you go out alone Moroccan people look at you differently, as if you were a bad person, as if you had no father, they believe that because you do not have a father or you're a bad person you go out with men. They think badly of you, they start to talk among themselves, men and I do not feel good... (59: 475) (NA, female)

• Boundaries and Expectations:

In this case, we observe a great interest in exploiting the migration project as a resource to achieve the most professional success possible. Values that are repeated by their parents and adolescents express them as commitments towards their families although sometimes there are discrepancies:

I am in my second year of compulsive secondary education, when I grow up I would like to be a doctor or a policeman but my parents would rather I became a doctor. 32: 475 (NN, man)

• Constructive Use of Time

Moroccan teenagers talk about how they must make good use of it to achieve academically in school in relation to the previously defined family commitment:

I study in the evening when I get home, sometimes for two hours. I get good grades but in Geography they are not that good, I have an exam on Friday. The ones I like the most are Maths, Science, Technology, Drawing, Language Literacy... I do not understand it much. 34: 475 (SN man)

In relation to leisure time we obtained interesting results. Whilst the common denominator is the development of activities related to new technologies and other activities that involve little physical activity, in the case of boys, doing sports activities plays a major role as a fun sport activity that contrasts with the almost complete lack of physical activity in the case of girls. The development of these physical and sports activities among boys promotes peer relationships and increases their social resources as opposed to the situation of girls.

I play soccer in the evenings, I train on Mondays, Wednesdays and Thursdays and we play on Saturdays and Sundays. We have ranked tenth in the league. 284: 475 (OS, man)

With regard to Internal Assets we observed the following:

• Positive and healthy values:

There is a huge interest in health and its maintenance. A direct relationship between healthy behaviours and Moroccan cultural patterns is established albeit not always successful.

I'm in good health, I eat healthy food, I do not smoke or anything, I do not like those things and could not care less about them. I use the Sheesha as it is less harmful, it is less harmful than tobacco or imagine what joints contain. 344: 475 (FA, man)

• Social Capabilities

Even though there is a huge exchange of cultural norms of the majority social group, it is true that Moroccan girls still play a role that is more focused on the family and home. However, men show more of an external outlook, which increases their ability to establish relationships with locals and incorporate habits that they consider to be healthy although this is not always the case. There is an unstable balance between the values from their place of origin and those that have been incorporated:

When we get together we go to party to Ejido, Roquetas, to pizzerias, we sit... we organise "botellones" and we drink almost everything, even alcohol. We drive there and return at five-thirty or six o'clock in the morning. I don't smoke, I have never tried it, I do like sheesha though. 327: 475 (FA, man)

• Positive identity and control:

We observed, as a general rule, a positive self-perception and self-control in critical situations typical of their age. They defend their own identity traits and consider different point of views in relation to their cultural group:

There are people who do not like our culture and traditions, but they have to accept them too, they believe that we come from a poor country and tell us to go back there, there are some racist people but most of them are good people 384. 475 (HH, female)

• Learning Commitment

Overall, they seem to be open to incorporating knowledge and skills that could be deemed useful. The problem arises in situations of cultural clash. In these cases, they are fully aware of the importance that people who have cultural competence give to them and they are able to address certain aspects from the cultural awareness perspective:

The best places and times in school are the playground and with the counsellor because he explains many things I like and Physical Education 188. 475 (YB, female).

CONCLUSIONS

Moroccan adolescents possess a number of specific health assets, which results in the need for an individual education and promotion approach. They show unique characteristics not only in relation to the dominant cultural group but also their own parents, as they have established relations with the Spanish culture differently from their parents both from a qualitatively and quantitatively perspective.

Based on an idealisation of Moroccan life patterns as a healthy life cliché, they are aware of the importance of not incorporating unhealthy behaviours from the Spanish culture that are also rejected by their cultural group. Nevertheless, sometimes acculturation strategies are geared towards a trend of assimilation especially when such behaviours are considered to be peripheral or not an identity characteristic of their cultural group. It is within this context that they sometimes incorporate unhealthy customs and habits.

Aspects such as seeking support for decision-making processes that are considered as important in references of their own cultural group, the role the family plays in decision-making or the perceived opportunity of the migration project, influence the manner in which education and health promotion can be perceived as a resource in the migration project. Health care and maintenance as a positive value together with the ability to socialise, somewhat less developed among girls, promotes interest in health-orientated habits and customs.

It is worth highlighting the situation of adolescent girls of Moroccan origin. They are regarded as guarantors and having more responsibility regarding the maintenance of the cultural identity than men, whilst at the same time they are also aware of the different alternatives that can, in some cases, stir into controversy with the cultural norms. Ultimately, it is a continuous, adaptive process of unique cultural patterns and knowledge and skills identified as beneficial in relation to health.

The manner in which all the health assets influence each other (both external and internal) allow us to plan health Education interventions for adolescents presenting these characteristics. The alignment of the content with their values, interests and concerns shall lead to the achievement of the objectives.

References

- Aibar, C. (2010). Educación para la Salud. In C. Colomer Revuelta & C. Álvarez-Dardet Díaz (Eds), *Promoción de la Salud y Cambio Social* (pp 61-73). Barcelona: Masson
- Antonovsky, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion Internacional*, 11, 11-18.
- Bouché Peris, H., (2004). Salud y educación en las culturas. In R. Perea Quesada (ed.), *Educación para la Salud. Reto de nuestro tiempo* (pp 21-46). Madrid: Díaz de Santos.
- Hernán, M., Lineros, C. & Morgan, A. (2013). Los activos para la salud personales, familiares y comunitarios. In M. Hernán, A. Morgan & A.L. Mena. *Formación en Salutogénesis y activos para la salud* (pp 15-26). Granada: Escuela Andaluza de Salud Pública
- Kretzman, J.P. & Mcknight, J.L. (1993). *Building Communities from the Inside Out: a Path Toward Finding and Mobilizing a Community Assets*. ACTA Publications, Chicago, Illinois.
- Morgan, A. & Ziglio, E. (2007). Revitalising the evidence base for public health: an assets model. *Promotion & Education*, 2, 17-22.
- Peiró, R. & Colomer, C. (2010). Investigación en promoción de la salud. En C. Colomer Revuelta & C. Álvarez-Dardet Díaz (Ed.). *Promoción de la Salud y Cambio Social* (pp 47-56). Barcelona: Masson.
- Perea Quesada, R. (2004). Integración curricular de la educación para la salud. En R. Perea Quesada (Ed.), *Educación para la Salud. Reto de nuestro tiempo* (pp 123-144). Madrid: Eds. Díaz de Santos.
- Wang, C. C., Morrel-Samuels, S., Hutchinson, P. M., Bell, L., & Pestronk, R. M. (2004). Flint Photovoice: Community Building Among Youths, Adults, and Policymakers. *American Journal of Public Health*, 94(6), 911-913.

Education For Work And Through Work In Boleslawa Lament Non-Public Preschool In Lublin, Poland

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ABSTRACT

The research was conducted in bl. Boleslawa Lament Private Preschool with Integration Classes named “Promyczki”. Blessed Boleslawa Lament based her educational system on Christian personalism, which assumes that man is born free and rational, and so she treated her pupils. The study is a part of the project which aim is to diagnose functioning of kindergarten. The paper answers questions: how is education for work and through work conducted, what methods and teaching means are used and what are its effects.

Methods used in the research include observation, analysis of children work, interviews with pupils and teachers, analysis of preschool documents, and register of teaching means. The study was conducted within 6 months in 2014/2015 school year with participation of 137 pupils and 12 teachers. It occurs that the level of work education is high and in accordance with core curriculum moreover the preschool uses efficient varied teaching means and methods.

INTRODUCTION – EDUCATION THROUGH WORK AND FOR WORK AND ITS GOALS

The work is one of the fundamental values of European culture. It is also highly valued in Poland. Not only because of its economic dimension, but mainly because of the personal dimension. Work, which is carried out under appropriate conditions, allows the man to develop as a person: the free and a rational being (Kwiatkowski, 2007).

“Education through work is a kind of human activity, intentionally and deliberately organized, in which we use work in the process of impact on the person and make changes in her or his personality” (Wiatrowski, 2005, p. 154). According to this definition, the work is treated as educational method. And we understand education to work as preparing children and youth for the proper perception of work as a value, as well as developing in them qualities of future employee (especially positive self-esteem, creativity and honesty). It is also important to shape child's willingness to continue learning, development of skills and abilities, preparing to find themselves on the labor market and take up satisfactory activity (Stróżyński, 1999).

The aims of education through work and for work are primarily:

1. shaping appropriate attitudes of young to work, to understanding the role of this part of human activity for the development of its future and the fate of the whole society; shaping belief about need and value of each job: productive, creative and service activities;
2. shaping readiness to work in accordance with personal possibilities and social needs;
3. gaining self-knowledge about their own abilities;
4. shaping interests, supporting various forms of creative activities of children;
5. developing skills of self-education, making youth curious, critical, and capable of understanding the possible choices and their consequences;
6. preparing to choose a profession (Bogaj, 2007).

These demands have found concrete expression in the educational and teaching program in kindergartens and schools in Poland. The primary goal is acquisition of skills of understanding the world and self-direction by youth. So education for activity in the world in the practical, cognitive and symbolic context is very important in

this part of education (Sieroń, 2007).

Education through work and for work is focused on building the overall competencies of the person; It is focused on building understanding and cooperation in the peers communities, rather than on competition; it is focused on the development of the autonomy of individuals, to prepare them for life in the context of the system of values; it shows the work ethos, too.

The child and young man should know their strengths and weaknesses, which manifest themselves in individual and team actions to make correct choice of the field of education and work in the future. It is also important to prepare children and youth for active and responsible life.

CORE CURRICULUM FOR PRESCHOOLS IN POLAND ABOUT EDUCATION FOR WORK AND THROUGH WORK

The aim of preschool education is, between others, preparing children for life in society as a valuable participant: intellectual development, communication development, but above all proper social and moral preparation – to acquire sense of right and wrong and to build system of values.

Kindergarten should also develop social skills e.g. cooperation, mutual help and respect for standards, as well as respectful attitudes towards other people – especially families, children in kindergarten and in other environments, teachers and other educators who work in preschool.

The core curriculum for preschools of Polish Ministry of Education has three areas within which social education should be made. These are: family education, civic and patriotic education. Child after completing his education in kindergarten shall inter alia: to know the names of family members, and to know what they are doing and where they work; to know the important state institutions, social and professional roles performed by different people, for example a doctor, a policeman, or a fireman. The child should also to know the value of his own and other people work and undertake his or her duties in cooperation with other children.

METHODOLOGY OF RESEARCH IN B. BOLESŁAWA LAMENT NON-PUBLIC PRESCHOOL IN LUBLIN, POLAND

The aim of our study was to describe and evaluate the level of education through work and for work in the Non-public Kindergarten with Integrated Classes in Lublin. Questions of the research concerned the scope of education for work, methods and forms of children's activities and teaching materials as well as compliance with the core curriculum. In order to conduct the research the method of observation, analysis of documents and interview with teachers and children were used but also there was prepared a record of didactic means in kindergarten. We use also the School Readiness Questionnaire for teachers. The research was comprehensive which means that it included all the teachers and children from kindergarten.

RESULTS

Presenting the results of research we will be answer the question: in which way kindergarten educate through work and to work. We will try to describe it considering subsequent indicators.

During a regular day in kindergarten children are implemented into self-reliance and self-service, for example through washing hands, face and teeth, using the toilet, dressing or eating. Every of this actions is performed more then once during the day.

Children have a permanently assigned duties. After playing, the toy have to be put back on its place, children help in setting the table, watering plants and feeding animals.

During each classes mostly activating methods are used. For example children perform artworks such as painting, drawing or modeling with plasticine, pupils also dance, sing, recite poems, run observations and experiments. It allows children to develop variety of activities.

Teachers use variety of teaching aids (sometimes simple but creative and ingenious, often complicated and modern multimedia resources, too), what – as we observed – encourage children to take variety of activities through arousing their interests and activity.

During classes creativity of pupils is developed in verbal and motor range, e.g. building with blocks, unrestricted artwork, unrestricted dance, motion tasks to unrestricted performance, mathematical and logic riddles.

Sometimes (but not often) boredom is used as a natural way to stimulate children's own activity and creativity.

Kindergarten has such an extensive program, that there is a little time left for use of methods like this.

Teachers offer to children not only execution of artworks, but also help them to continue and finish the work, in the case of difficulties. As a gratification for artwork completion teachers can offer praise, reward or putting the artwork on the exposition and showing to parents. This is very important for children self-satisfaction from work that they have done.

Children's communication skills are also developed. Every day they have an opportunity to talk, ask questions and express their opinions on variety of subjects. They are participating in discussions, brainstorming technique, creation of stories and tails, drama playing, they are listening while teacher reads to them. They learn English by the TPR method (Total Physical Response) and already we can observe effects, as children can sing, recite poems, and use simple phrases in English in everyday life.

Also children's self-presentation skills are developed: diction, posture, gestures, facial expressions, proper dress and behavior. The main method used are theater performances while pupils are actors. It takes place few times during the year on the occasion of family, national, and religious festival, and at the end of the year in the kindergarten. Pupils prepare each performance for couple of weeks. They are practicing roles, the way of speaking and acting. In effect they gain previously mentioned skills, but what is the most important courage and self-confidence.

Each preschool year begins with establishing rules of cooperation in group by teachers and pupils, e.g. we help each other; we respect other people's work, we take care of toys and tools, we clean after our self, we are benevolent – those are important traits for future employee.

Teachers try to avoid unnecessary competition – they rather teach children to help colleagues and cooperation. Competition is rarely used as a teaching method.

Children are given role models. First the teachers, in daily contact with pupils, try to be good role models, but secondly they also give different examples: parents, the saint patron of the kindergarten Boleslaw Lament, which highly valued honest, hard work and was very hardworking. Also other saints are given as an example.

Children are familiarized with professions of their parents and many different ones, mostly through talk, watching illustrations, movies, and reading books. Meetings with representatives of many professions are organized in kindergarten on regular basis, for example: miner, policeman, doctor, dentist, woodsman, musician, actor. Children are also visiting many workplaces, such as bakery, post office, glass factory, zoo, and others. In Village Museum in Lublin they are organized workshops for schools and kindergartens, when children can observe work of carpenter, potter, oilman, miller, beekeeper, embroiderers, spinners, weavers or feeding animals on farm and others. They can also try to make something, e.g. from a clay.

In kindergarten and during trips children are introduced to using many tools and they have opportunity to not only watch them but also try to use any of them. Those are old and traditional tools or modern and complicated (e.g. electronic).

Children are also very well prepared to further learning in primary school. Group of 6-year old were tested for school maturity with use of school maturity scale MAC (Skala Gotowości Szkolnej MACa). They had been tested in aspects of physical, mental and socio-emotional skills. Nineteen pupils were tested and fifteen of them scored high, and only four – average level. No children had been rated low in aspect of school preparation.

Most of these actions are performed in cooperation with parents. During regular meetings the issues of education to work and through work are taken. Parents willingly cooperate with kindergarten.

CONCLUSIONS OF THE RESEARCH AND THE DISCUSSION OF THE RESULTS

Education for work and through work in the Non-public Kindergarten of Blessed Boleslaw Lament in Lublin is conducted in accordance with the core curriculum of the Ministry of National Education. Kindergarten program is evaluated positively by the Education Office, the kindergarten has rich collection of teaching materials in the field of education for work, including many tools and modern technical means. Classes are taught in a creative way, using a variety of forms, means and methods of work with children, especially stimulation methods (e.g. excursions, walks, observation, experimentation), which stimulate children to activity and work. Children are interested in the transmitted content and they are active but also disciplined. An effects of education in our kindergarten are: mastering an attitude of respect for work, developing accurate traits of children (e.g. activity,

creativity, accuracy, punctuality), acquisition of social skills (e.g. communication, self-presentation), knowledge of variety of many professions, workplaces, tools, and very good preparation towards learning in school.

The test results are reliable – confirmed by the long-term participant observation. Of course, the tests shall be conducted in more kindergartens and compared with each other.

References

- Adamski, F. (2002). *Rodzina. Wymiar społeczno-kulturowy*. Kraków: Wydawnictwo UJ.
- Bogaj, A. (2007). Kształcenie przedzawodowe. In S.M. Kwiatkowski, A. Bogaj & B. Baraniak (Ed.), *Pedagogika pracy* (pp. 67-85). Warszawa: Wydawnictwa Akademickie i profesjonalne.
- Głogowska, R. (2005). *Wychowanie do pracy w rodzinie i szkole*. Zeszyty Karmelitańskie, 3(32), pp. 54-57.
- Harasimiak, G. (2011). Obowiązek zapewnienia edukacji dzieci przez ich rodziców w świetle prawa kanonicznego. In J. Piskorski (Ed.), *Szkola domowa. Między wolnością a obowiązkiem* (pp. 41-52). Warszawa: Instytut Sobieskiego.
- Jan Paweł II (2005). Encyklika Laborem exercens. In *Encykliki Ojca Świętego Jana Pawła II* (pp. 101-154), vol. I. Kraków: Wydawnictwo Św. Stanisława BM Archidiecezji Krakowskiej, Wydawnictwo M.
- Kiereś, B. (2009). Rodzina w kulturze. In K. Gryzeń (Ed.), *Małżeństwo i rodzina w życiu i rozwoju człowieka* (pp.17-26). Warszawa: Wydawnictwo UKSW.
- Kulczycka, B. (2007). Obowiązki domowe dzieci w opinii rodziców. In E. Konovaluk & M. Nowak (Ed.), *Praca – Etos – Wychowanie* (74-76). Biała Podlaska: Instytut Pedagogiki Państwowej Wyższej Szkoły Zawodowej im. Papieża Jana Pawła II w Białej Podlaskiej.
- Kwiatkowski, S.M. (2007). Pedagogika pracy jako subdyscyplina pedagogiczna. In S.M. Kwiatkowski, A. Bogaj & B. Baraniak (Ed.), *Pedagogika pracy* (pp. 13-22). Warszawa: Wydawnictwa Akademickie i Profesjonalne.
- Łuka, M. & Truskolaska, J. (2015). Rodzina środowiskiem kształcenia przedzawodowego. In M. Duda & B. Majerek (Ed.), *Wyjechać czy pozostać? Wokół dylematów rynku pracy* (pp. 297-314). Kraków: Wydawnictwo Naukowe Uniwersytetu Papieskiego Jana Pawła II.
- Ministerstwo Edukacji Narodowej (2014). *Podstawa programowa z komentarzami*. [On-line]. Available: <http://men.gov.pl/pl/zycie-szkoly/ksztalcenie-ogolne/podstawa-programowa>.
- Niewęglowski, J. (2009). Małżeństwo i rodzina według nauki Kościoła katolickiego. In K. Gryzeń (Ed.), *Małżeństwo i rodzina w życiu i rozwoju człowieka* (pp. 43-56). Warszawa: Wydawnictwo UKSW.
- Pindera, M. & Kowolik P. (2007). Wychowanie przez pracę i do pracy dzieci przedszkolnych. In E. Konovaluk & M. Nowak (Ed.), *Praca – Etos – Wychowanie* (pp. 226-241). Biała Podlaska: Instytut Pedagogiki Państwowej Wyższej Szkoły Zawodowej im. Papieża Jana Pawła II w Białej Podlaskiej.
- Rachalska, W. (1984). *Wybór zawodu a wychowanie przez pracę w rodzinie*. Warszawa: Instytut Wydawniczy Związków Zawodowych.
- Sieroń, R.B. (2007). *Model wychowania chrześcijańskiego według św. Pawła Apostoła*. Sandomierz: Wydawnictwo Diecezjalne i Drukarnia.
- Stróżyński, K. (1999). *Wychowanie do pracy*. Edukacja i Dialog, 2, pp. 60-61.
- Truskolaska, J. (2010). *Opieka, wychowanie i partnerstwo w rodzinach wiejskich i miejskich województwa lubelskiego na początku XXI wieku*. Lublin: Wydawnictwo KUL.
- Wiatrowski, Z. (2005). *Podstawy pedagogiki pracy*. Bydgoszcz: Wydawnictwo Akademii Bydgoskiej im. Kazimierza Wielkiego.
- Więckiewicz, B. (2011). Eurosieroty – cena emigracji. In B. Więckiewicz (Ed.), *Problem eurosieroctwa. Wybrane aspekty* (pp. 11-32). Stalowa Wola: Wydział Zamiejscowy Nauk o Społeczeństwie KUL w Stalowej Woli.

Educational Reform For Economic Development: A Case Study Of Brunei Darussalam

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ABSTRACT

Globalization has increased economic competition within and between countries and the world's regions. Economic competitiveness is commonly seen as a valid index for judging a country's level of economic prosperity. Many recent large-scale education reforms have been justified by the urgent need to increase labor productivity and promote economic development and growth through expanded and improved education. It is generally assumed that to increase economic competitiveness, citizens must acquire knowledge, skills and attitudes necessary for civic success and the knowledge-based economy as highlighted in the reports by Kelly and Jones (2007) and Kirsch, Braun, Yamamoto and Sum (2007). In relation to these reports, this paper will explore the role of education in promoting work force development and economic well-being of Brunei focusing on reforms made to enhance its educational quality to meet market demands and increase economic competitiveness. This paper will conclude by drawing on lesson learnt from experiences in the state of California and identifying changes to be taken by Brunei in its schooling institutions to ensure the acceleration of its economic development and reducing the economic gap it has with industrial and other developing countries.

Keywords: Education, Reform, Economic Growth, Work Force Development

INTRODUCTION

The 21st century presents tremendous challenges and significant opportunities to national policy makers as they formulate economic and social policies and programs. Increasingly, educational policy makers are being asked to formulate educational policies and programs in ways that advance the nation's economic and social development goals. Today's globalized and highly competitive environment calls for a productive workforce that is skilful, efficient (doing things right), effective (doing right things) and innovative. This is imperative for any nation that seeks to build a knowledge-based economy via highly competent, well-educated human resource capital. According to a report by APEC Committee Report (2000, p.xi), one of the precondition of a knowledge based economy (KBE) is "... Basic education is a long-term investment, without which a KBE is unsustainable. In a fully developed KBE, high quality education services that are both widely available and widely used are a major priority for the economy and society..... Secondary enrolment in both the Asian Fast-Growing Economies and the Latin American Economies falls well short of this precondition for a KBE". In the face of these challenges, countries are confronted with the need to rethink their educational systems to prepare students for the global economy, maintain economic progress, and assure that their citizens will benefit equitably from these developments.

The first part of this paper will discuss the role of education in economic development. In developed countries such as the United States as reported in studies conducted by Jones and Kelly (2007), Kirsch, Braun, Yamamoto and Sum (2007) as well as studies conducted by Reed (2008) and Johnson (2009) for the state of California indicated that a state's stock of human capital can contribute to its economic growth and prosperity. Subsequently, in the second part of this paper will look at a small developing country in the South East Asian region, Brunei Darussalam. This section will discuss the challenges and efforts made by Brunei in responding to its national vision to develop its education towards producing more marketable population who can compete on a global scale and play an important part in the development of its economy. Finally, this paper will also discuss how Brunei can move forward in developing its education for economic growth based on the experiences encountered by the state of California.

ROLE OF EDUCATION IN ECONOMIC GROWTH

According to Sahlberg (2006), many countries are reforming their education systems to provide their citizens with knowledge and skills that enable them to engage actively in democratic societies and dynamic knowledge-based economies. The fundamental requirement for this is that everyone has sufficient knowledge and skills in literacy, numeracy and information and communication technologies (ICTs). Sahlberg (2006) also stated that by investing in both primary and secondary education, it will significantly contributes to economic development and growth as research recognizes people as human capital and that by increasing the investment in knowledge and skills, it could contribute to future returns to the economy through increases in labor productivity. Additionally, Jones and Kelly (2007) also pointed out in their report that strong economies are characterized by an abundance of well-paying jobs which overwhelmingly are often held by people who have knowledge and skills obtained

through education preferably beyond high schools. It has also been indicated by other studies (Hanushek et al., 2008) that to participate in the global economy and to improve their standard of living, students will need to leave school with a deeper understanding of school subjects, particularly science and mathematics. They will need skills necessary to respond to an unbounded but uncertain 21st century—skills to apply their knowledge to real-world situations, to think critically, to collaborate, to communicate, to solve problems, to create, and continue to learn. Such conviction is supported by a study conducted by Borensztein et al. (1995) on the effect of foreign direct investment (FDI) on economic growth. The findings from this study indicated that FDI in the host country will achieve higher productivity if the host country obtains a minimum threshold stock of human capital. This reiterates the importance of education in promoting economic growth. However, in other studies conducted by Wang and Wong (2011) and Hanushek and Woessmann (2007), they highlighted that although their findings supported the importance of education in promoting positive impact on economic growth of a country, they also found that the quality of education (measured by cognitive skills of the population) rather than just school attainment is positively and robustly related to economic growth.

EDUCATION CHANGING ECONOMIC LANDSCAPE IN CALIFORNIA

In their report on ‘America’s Perfect Storm’, Kirsch et al. (2007) stated that America is in the midst of a perfect storm that is having a considerable impact on the country. This storm is as a result of the confluence of three powerful forces. The first force is the divergent skill distributions, which sees the wide disparity of literacy and numeracy skills among school age and adult population in the United States (US). The second force is the changing economy, which results in new sources of wealth, novel patterns of international trade and a shift between capital and labor. This economic change occurs due to technological innovation and globalization. These economic changes and shift in the positions of jobs in the country have contributed to the premium earnings accruing to the level of educational attainment. This means that individuals who have higher educational attainment and cognitive skills will substantially earn more (Reed, 2008). This also reflects the findings by Hanushek et al. (2008) which stated that a country’s economy is not only boosted by the labor force schooling attainment but also the quality of the education. Hence, income equality is also widening between those with a college diploma and those with only a high school diploma. Individuals with less education will not only earn less but will need more help from social services. The third force in the perfect storm is the demographic changes within the country where population growth is attributed to the high rates of migration and birth rates among Hispanic population, which historically has a large population with low college attainment levels. Considering the Hispanics and African-Americans are by far the fastest growing groups among the country young adult population, their lack of college diploma will affect US effort to remain economically competitive.

CLOSING ECONOMIC GAP THROUGH EDUCATION

Based on the projected demand for college graduates for the state of California to be increased by 2025, the state needs to increase the number of Bachelor degrees awarded by 40% above the current level. For this to materialize the state needs not only to improve and expand its higher education system but also to develop and strengthen its K-12 system as to enable it to reduce the number of high school dropouts. This echoes the point emphasized by Sahlberg (200), whereby he has stressed the importance of investing in quality education both at the primary and high school levels. Considering the widening education and economic opportunities gap for young working age people in California, Johnson (2009) has highlighted a number of ways by which California can narrow the gap. This includes increasing the college going rates for high school graduates which can be achieved by strengthening K-12 system and preparing high school graduates for college expectation in terms of financial and academic challenges. There is also a recommendation to develop other opportunities apart from bachelor option in the form of post-secondary training program including in technical education. Johnson (2009) also stated that because more than 701 percent of California college students are in community colleges then transfer rate should be improved by introducing remedial programs and coordinating course requirements between community colleges and four-year universities. In addition, it was also recommended for California to increase the completion rates especially among California State Universities (CSU) by ensuring students receive supports and resources to help them complete their program within the given time. Between these three areas, the least expensive is to increase the completion rate. In summary, in its effort to sustain economic growth, California policy makers have decided to fund, support and introduce intervention programs as to provide quality education that will be enable the increase of the number of college graduates and narrow the gap of the projected demand and the income inequality.

BRUNEI DARUSSALAM: AN INTRODUCTION

In comparison to California which is one of the developed state in America, Brunei is a small developing country with a population of 415,717 and is heavily dependent on its oil and gas industry which accounts for 68% of the country Gross Domestic Product (GDP). Since the discovery of oil in 1929, Brunei Darussalam’s population is

currently enjoying one of the highest GDP per capita i.e. US\$39,700 amongst ASEAN (Association of Southeast Asian Nation) member countries in 2013 (Oxford Business Group, 2014). Education, therefore, plays a critical role in equipping the country with human resources needed to support its diversification agenda. Thus, it is the mission of the Brunei's Ministry of Education to provide holistic education as to achieve the fullest potential for all by giving quality education particularly to its young population. To meet future challenges in an ever changing world, the Ministry of Education has developed a vision of 'Quality education towards a developed, peaceful and prosperous nation'. It is the aim of the ministry that this vision will realize the nation's aspirations and produce citizens who are committed and capable of contributing towards the continued growth, stability and prosperity of the country. Hence, the Ministry of Education has a policy of providing a minimum of 12 years of education. This comprises 7 years in primary education (inclusive of 1 year in pre-school) and 5 years in secondary as illustrated in Figure 1. The secondary level follows a two-phase stage: lower secondary and upper secondary. The lower secondary level covers three years of education at the end of which students sit for the Lower Secondary Assessment or *Penilaian Menengah Bawah* (PMB) examination. At the start of their secondary education, students are placed in either the mainstream or Level II programme. It is the aim of lower secondary education to prepare students for upper secondary and vocational/technical education and training. The majority of students will proceed to Brunei-Cambridge General Certificate in Education Ordinary level (GCE 'O' Level) 'following the mainstream curriculum whilst the Level II caters for those who are motivated by a vocationally-oriented curriculum. In the upper secondary, based on their PMB performance, students in the mainstream curriculum are placed in either the Science or Arts Stream. Level II students follow the Secondary Vocational Programme (*Program Menengah Vokasional* - PMV). The duration of schooling at these levels is either two or three years.

Education at the upper secondary level is general in nature with some provision for specialization in science, arts and technical fields. At the end of the second year, high academic achievers may sit for the Brunei-Cambridge GCE 'O' Level examination. As of 2006, apart from the National Vocational Certificate (NVC) in Clerical Studies, other options available to PMV students are the National Trade Certificate Grade 3 (NTC3) in various vocational subjects. The PMV programme spans a period of 2 years, consisting of a 6-month foundation course, a one-year NVC/NTC3 course and a six-month attachment.

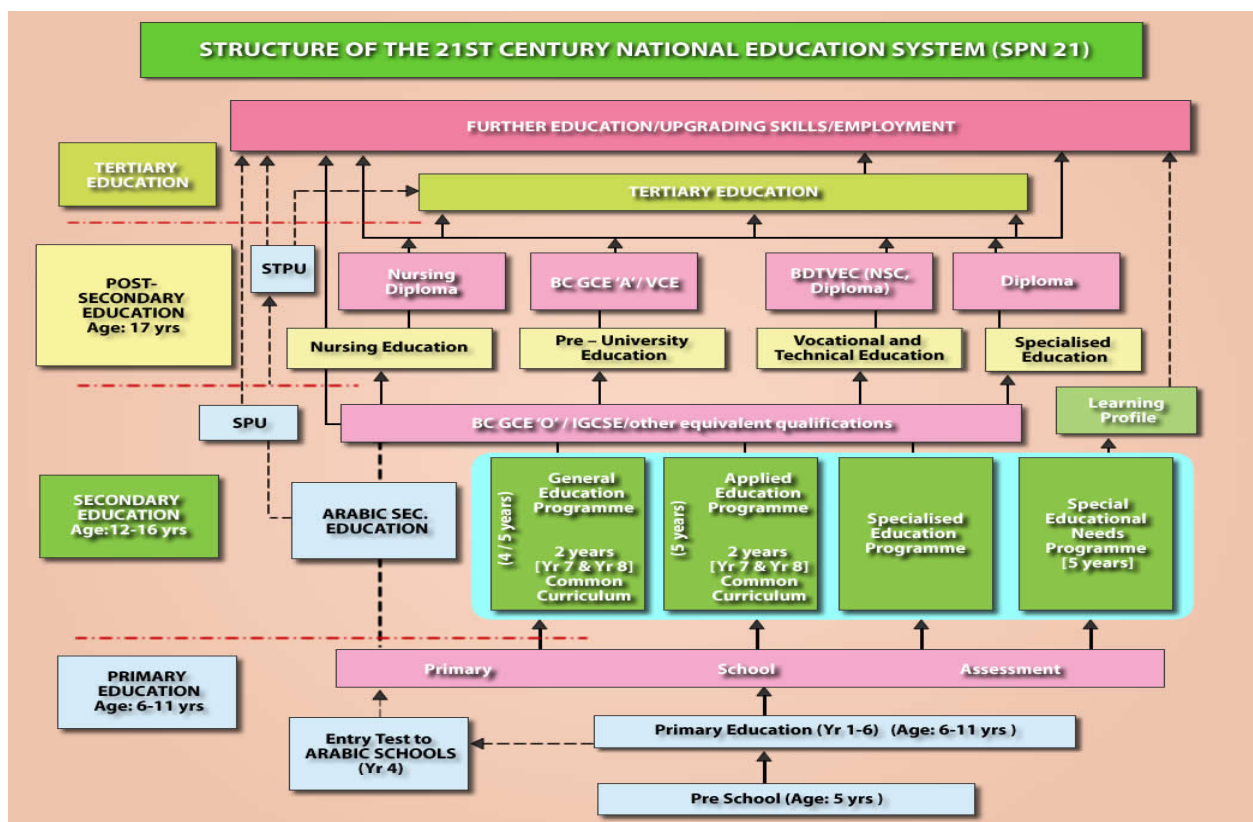


Figure 1: Brunei education structure (Ministry of Education, 2009, 2012, 2013)

All subjects are taught in English except *Kemahiran Bahasa Melayu* (Malay Language Specialization), *Tarbiah Islam* (Islamic Studies) and *Bimbingan Asas Etika Kerja* (Career Guidance Foundation Ethics). Students who have successfully completed PMV will be awarded a certificate in BDTVEC NVC or NTC3 which is recognized by the National Accreditation Council and the Public Service Commission.

To date there are 118 primary schools; 30 secondary schools; five sixth form colleges; six vocational and technical institutions and four universities throughout the country. As the main provider of education in the country, all these levels falls under the jurisdiction of the Ministry of Education. All the Public or Government Schools are funded by the Government. Citizen does not pay any school fee and non-citizens only pay very minimal school fee. Privately-funded schools provide more choice and variety for students in Brunei and they account for 30% of the number of educational institutions in this country. A few international schools like the Jerudong International School (JIS) and International School Brunei (ISB) have also established themselves in the education landscape offering a British curriculum (ISB offers a modified version of the National Curriculum of England) where pupils work towards General Certificate in Secondary Education (GCSE) and 'A' level (Advance level) / International Baccalaureate (IB) qualifications. The Brunei Ministry of Education is committed to improving and ensuring a better future for the younger generations and has made substantial efforts to review and improve its educational services. The introduction of the 21st National Education System, also known in the Malay Language is *Sistem Pendidikan Negara Abad ke-21*, or codenamed SPN21 in 2009, marked a milestone in the development of the country's education system (Ministry of Education, 2009, 2012b, 2013). SPN21 strives to make significant changes by providing a more balanced curriculum emphasizing on assessment for learning and providing more relevant technical education in line with the 21st Century needs and to build a more educated and skilled workforce, (Tajuddin, 2015).

ECONOMIC CONCERNS AND ROLE OF EDUCATION

Unlike education in countries within the ASEAN region such as Thailand and the Philippines, which only provide government funding to needy student, in Brunei Darussalam, all citizens studying in the education system including at the four public universities who meet the entry requirements are recipients of government financial aid. On average it costs the government around BN\$12,000 (US\$9,500) per year for a student undertaking a Bachelor Degree in a local universities. Still, Brunei is not immune to the dynamics and forces driving change in society and the world. According to Brunei Darussalam education statistics (Ministry of Education, 2012a) some 6,378 students are enrolled in its four universities. This figure account for only 13% of 19 year olds that are currently enrolled in education, (Oxford Business Group, 2014). This figure is very much lower compare to that of California. In 2011, Department of Economic Planning and Development (DEPD) recorded 18,815 unemployment among Brunei working-age population. This figure has increased by 158% since 1981. The alarming aspect of it is that three out of four of the unemployed have a high school diploma but not a college diploma. If no intervention program is taken to address this issue, the unemployment rate for Brunei will continue to rise and this will lower its opportunity to diversify and develop its economy.

In relation to the number of high school graduates that continue to pursue their education post-secondary or post-high schools, the percentage of students continuing their studies in Technical and Vocational Institutes has continuously been low since 2010 (Figure 2).

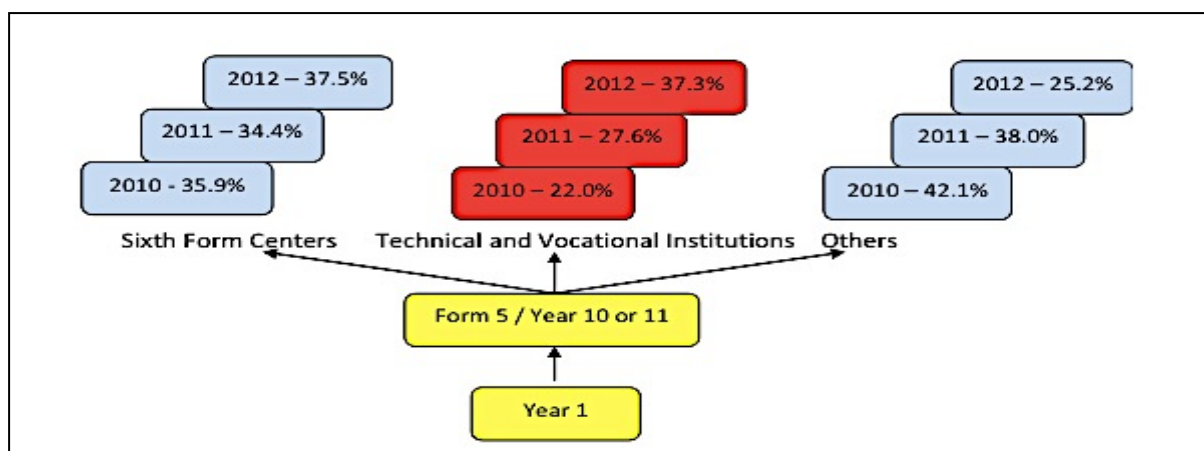


Figure 2: Percentage of students going to different pathways after 'O' Level (Ministry of Education, 2012a)

One of the indicators on success and transition for SPN21 is that there has been a steady increase in the number of students in high schools progressing to vocational and technical education. GCE ‘O’ Level results in 2010, 2011 and 2012 also show that there are consistently high percentages of students who obtained 4 and less credit for their ‘O’ level (Table 1). Often than not, these are the students who could not pursue their studies in the sixth form centers and might want to continue in the Technical and Vocational Institutes.

Table 1: O Level credit pass obtained according to number of subjects (Ministry of Education, 2012a)

Year	GCE ‘O’ Level (5-11 Subjects)	GCE ‘O’ Level (0-4 Subjects)
2008	34.32%	65.68%
2009	33.69%	66.31%
2010	33.30%	66.70%
2011	36.03%	63.97%
2012	30.50%	69.70%

The projected scenario for Brunei Darussalam is that if it does not diversify its economy, it might experience a slow economic growth. Hence, it is important for Brunei to improve its education so that it can produce more college degree graduates to ensure its economy will continue to grow, develop and sustainable.

STRATEGIES TO CHANGE EDUCATION AND ECONOMIC LANDSCAPE

In response to the national vision of a modern, harmonious and progressive society, the 21st Century New Education System (SPN21) initiative was introduced in 2008 aiming to build a more educated and skilled workforce. This is a strategic policy shift in education to support Brunei Vision 2035, SPN21 ensures that all students will have at least 10 or 11 years of schooling before progressing to the Sixth Form, Polytechnic or TVE under the Department of Technical Education (DTE). At this juncture, it is the nation’s plan to boost university enrollment from around 14% to 30% in the next 10 years. Over the past couple of years, Brunei Darussalam has been focusing in increasing the access in higher education for its young population. The Brunei Darussalam statistical yearbook (2011) indicated that there were a total number of 758 students enrolled in private higher education institutions in 2011 (DEPD, 2011). This is an increase of 924% from the previous year which only recorded a small number of 82 students.

In addition, the national challenge is to build a first class education system that will provide opportunities for every citizen and resident to meet the manpower needs and new jobs that will be created with economic diversification. In order to fulfill the Ministry of Education’s mission “to provide holistic education to achieve fullest potential for all” the Technical and Vocational Education and Training (TVET) which is increasingly considered as part of the mainstream education, has created important pathways towards enhancing competencies for honing employability skills necessary for creating highly successful economy. Unlike California, where the focus is more on the higher education especially in ensuring more high school graduates enroll and complete their college degree, in Brunei, the focus is more on providing training programs for high school graduates in the technical and vocational institutions.

One of the strategies in SPN21 initiated by the TVET in the country is to equip students with the skills and knowledge considered useful and necessary to render them the abilities to compete successfully at local and international levels. The SPN21 aims to produce citizens who are committed and able to contribute to the future growth, prosperity and stability of Brunei Darussalam (MOE Strategic Plan, 2012). TVET plays a very important role to improve student success rates and enhance their marketability upon their entry into the job market. By helping individuals to gain access to TVET, it can impact positively on the country’s economic development, achieving full employment and promoting social inclusion. A well-structured TVET system will enable productivity, enhance competitiveness and promote entrepreneurial activities in preparing individuals for productive livelihoods. Although TVET is seen instrumental in sustaining development, Brunei Darussalam’s TVET has been left to its periphery and its significance has not really been recognized. Currently, transformation plan is in the process to ensure that labor market priorities are identified along with the initiative to rebrand the vocational and technical institutions (VTIs) as equally preferable institutions for post-secondary education in the country. Policy makers, administrators and educators in various fields of TVET have all agreed that TVET plays an important role in the economic and social development of a nation. To become more effective in managing its human resources and developing an integrated approach to skills development, Brunei has started to re-think about the current position of TVET system in the education system. Currently, as presented in the 5 year strategic plan (2013 –2018), Brunei TVET is introducing a number of plans of actions required for modernization of TVET in Brunei which falls under the following broad themes of: (i) course restructuring; (ii)

expanding apprenticeship options; (iii) progression opportunities; (iv) upgrading the training environment and v) renaming DTE and vocational institutes.

WAY FORWARD

In conclusion, the approach practised by the Brunei government has helped to increase access in higher education amongst young people in Brunei. However, to achieve its target of 30% enrollment for its tertiary education the government will need to continue to improve its pre 'A' Level education and to create more avenue for post secondary education to continue their studies at the higher education level. This is where Brunei can benchmark what the state of California has introduced. Knowing the rate of enrollment for colleges in Brunei is very low, the Ministry of Education should start to look into the introduction of preventive measures by first strengthening its primary education especially in the area of Sciences and Mathematics. According to Hanushek and Woessmann (2007), such measure is necessary because increasing the number the average number of years of schooling will boost the economy. This is achievable only if the increased levels of school attainment also boost cognitive skills. Therefore, Brunei need to focus on not just keeping the students in school longer but ensuring that their Science and Maths skills are well developed. In addition, the Ministry of Education should also seriously look into introducing remedial programs and prepare high school students to life in colleges.

References

- APEC Economic Committee Report (2000). *Towards Knowledge Based Economies in APEC*. APEC Secretariat.
- Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, 45(1), 115-135.
- Department of Economic Planning and Development. (2011). *The Brunei Darussalam Statistical Yearbook 2011*. Prime Minister's Office, Brunei Darussalam.
- Hanushek, E. A., Jamison, D. T., Jamison, E. A., & Woessmann, L. (2008). Education and economic growth. *Education Next*, 8(2), 62-70.
- Hanushek, E. A., & Woessmann, L. (2007). *The role of education quality in economic growth*. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/7154>
- Johnson, H. (2010). *California workforce: Planning for a better future*. San Francisco, CA: Public Policy Institute of California.
- Johnson, H. (2010). *Educating California: Choices for the future*. San Francisco, CA: Public Policy Institute of California.
- Johnson, H., & Sengupta, R. (2009). *Closing the gap: Meeting California's need for college graduates*. San Francisco, CA: Public Policy Institute of California.
- Jones, D., & Kelly, P. (2007). *The emerging policy triangle: Economic development, workforce development and education*. Boulder, CO: Western Interstate Commission for Higher Education.
- Kirsch, I., Braun, H., Yamamoto, K., & Sum, A. (2007). *America's perfect storm: Three forces changing our nation's future*. Princeton, NJ: Educational Testing Service (ETS).
- Reed, D. (2008). *California's future workforce: Will there be enough college graduates?* San Francisco, CA: Public Policy Institute of California.
- Ministry of Education. (2009). *The National Education System for the 21st Century SPN 21*. Ministry of Education, Brunei Darussalam.
- Ministry of Education. (2012a). *Brunei Darussalam Education Statistics 2011*. Ministry of Education, Brunei Darussalam.
- Ministry of Education. (2012b). *Strategic Plan 2012-2017*. Ministry of Education, Brunei Darussalam.
- Ministry of Education. (2013). *The National Education System for the 21st Century: SPN21 (Revised ed.)*. Ministry of Education, Brunei Darussalam.
- Oxford Business Group. (2014). *The Report: Brunei Darussalam 2014*. Retrieved from <http://www.oxfordbusinessgroup.com/brunei-darussalam-2014>
- Tierney, W. G., & Findlay, C. (2008). *The globalization of education: The next wave*. Heng Mui Keng Terrance, Singapore: Pacific Economic Cooperation Council and the Association of Pacific Rim Universities.
- Tajuddin, S. Z. K. (2015). *The impact of school leadership on student achievement: A gap analysis*. Unpublished Doctoral Thesis, Rossier School of Education, University of Southern California.
- Sahlberg, H. (2006). *Education reform for raising economic competitiveness*. *Journal of Educational Change*, 7, 259-287.
- UNESCO, Institute for Statistics. (n.d). Retrieved from <http://www.uis.unesco.org/Education/>
- Wang, M., & Wong, M.C. S. (2011). *FDI, education, and economic growth: Quality matters*. *International Atlantic Economic Society*, 39, 103-115

Embedding The Perception Of Organizational Culture In The Studies Of Sport Management

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ABSTRACT

The aim of this paper is to provide an overview of the modes which are currently used to increase the students' perception of the theory and practice regarding the organizational culture in the studies of sport management. The increased interest in the phenomenon of organizational culture in the sports industry and sport as such has led to an attempt to define the meaning of what this concept means in terms of organizations' performance and human resources management in sport and its sectors, namely public, non-profit and professional. On the basis of this, the paper offers a conceptual framework of how to embed the topic of organizational culture in sport management studies. The teaching methods which could be appropriate for the development and enhancement of the perception of this in the nature of an intangible topic in a sports context are discussed. The case study from Czech Republic is presented based on the qualitative analysis of the students' assignments.

INTRODUCTION

The concept of organizational culture has been heavily researched since the 1980s, alongside its growing popularity in management texts. Based on Schein's work (1985) many other authors have developed this challenging issue, especially in relation to organizational leadership, human resources management and organizational performance. Sports organizations are no exception when it comes to the basic principles of organizational culture. In spite of this fact there has been little research and scholarly writing regarding this topic in sport management. Weese (1995a, 1995b, 1996) offers a look at leadership and organizational culture, Westerbeek (1999) offers the modelling of organizational culture in sport organizations and Kent and Weese (2000) studied organizational effectiveness and culture. Frontiera (2010) examined the phenomena of change in the organizational culture in professional sport and his qualitative study offers an initial model called Culture Change Cycle. MacIntosh and Doherty (2010) examined the influence of organizational culture on job satisfaction and intention to leave through a survey of fitness staff. But the topic of organizational culture and its significance for sport organizations has not been reflected properly in the design of sport management studies. The most popular and respected academic standards with regard to the curricula of sport management have been set by North American Society of Sport Management (NASSM). In the USA the curricula standards have been set by the continental association NASSM and later on in September 2007, NASSM and the National Association for Sport & Physical Education (NASPE) officially launched the Commission on Sport Management Accreditation (COSMA) organization in July 2008. COSMA was created as a specialized accrediting body whose purpose is to promote and recognize excellence in sport management education in colleges and universities at baccalaureate and graduate levels through specialized accreditation. According to the COSMA Accreditation Principles and Self-Study Preparation (June 2010, p.17), excellence in sport management education at undergraduate level requires coverage of the key content areas of the sport management field. Thus the Common Professional Component (CPC) topical areas, as outlined below, should be adequately covered within the content of undergraduate sport management degree programmes.

A) Social, psychological and international foundations of sport

B) Management

- 1) Sport management principles
- 2) Sport leadership
- 3) Sport operations management/event & venue management
- 4) Sport Governance

1) Principles of sport finance

C) Ethics in sport management

D) Sport Marketing & Communication

E) Finance/Accounting/Economics

2) Accounting

3) Economics of sport

F) Legal aspects of sport

G) Integrative Experience, such as:

1) Strategic Management/Policy

2) Internship

3) Capstone experience (an experience that enables a student to demonstrate the capacity to synthesize and

apply knowledge, such as a thesis, project, comprehensive examination or course, etc.).

In the United Kingdom the academic standards are set by UK documents in terms of the learning outcomes' description following the implementation of the European Qualification Framework and can be found as a result of the development of the Frameworks for higher education qualifications in England, Wales and Northern Ireland and also for Scotland. These documents contain the descriptors for each cycle of study (BA, MA and Ph.D.), known as the 'Dublin descriptors' which illustrate the typical abilities and achievements associated with qualifications that signify the completion of each cycle. In addition the Subject benchmark statements introduced by the Quality Assurance Agency for Higher Education (QAA UK) provide a means for the academic community to describe the nature and characteristics of programmes in a specific subject or subject area. They also represent general expectations about standards for the award of qualifications at a given level in terms of the attributes and capabilities that those possessing qualifications should have demonstrated. The relationship between the standards set out in the Subject Benchmark and those produced by professional, statutory or regulatory bodies for individual disciplines is a matter for individual higher education institutions to consider in detail. For sport management study programmes the standards are set by the Subject Benchmark, Hospitality, leisure, sport and tourism (QAA, 2008).

Sport degree programmes will often involve the study of one or more of the following:

- human responses and adaptations to sport and exercise
- the performance of sport and exercise and its enhancement, monitoring and analysis
- health-related and disease management aspects of exercise and physical activity
- historical, social, political, economic and cultural diffusion, distribution and impact of sport
- policy, planning, management and delivery of sporting opportunities

Curriculum content may include human anatomy and physiology, kinesiology, human growth and development, exercise physiology, exercise science, exercise psychology, sport biomechanics, sport nutrition, physical education (non-qualified teacher status), motor learning, training theory, skill acquisition, coaching process, sports notation, sport injuries, sport psychology, sport strategy, sport technology, sport sociology, Olympic studies, sport economics, sport politics, sport history, sport philosophy, social and cultural issues, sport for special needs, sport law, sport ethics, sport development, sport management, sport psychology, sport development, and sport marketing. In all cases a relevance to, and focus on, vocation will normally be emphasized. Following these standards a lot of specialized disciplines and subjects in sport management have been developed and, considering the most provoking issues in sport, special attention has been paid to the development of the new subject ethics in sport or sport ethics. This subject has been included in the sport management curricula especially in the case when the sport management study programme is provided by business schools (Nová, 2014). Not much consideration has been paid to the fact that also the topic of organizational culture can play a crucial role when it also comes to the transversal issues to which the ethics in sport belong.

Future sport managers should understand (as this is accepted by managers in any other businesses) that organizational culture can contribute to a great extent to the success and fulfillment of social, economic and sport goals of the sport organizations. They can also be able to recognize properly the type of culture and when needed (for the sake of the success or even organizational existence) be ready to create a new one or maintain and change the current sport organization's culture.

Therefore this paper offers a perspective/ conceptual framework of how to emphasize the importance of, and how to embed, the perception of organizational culture in the studies of sport management. Following the personal experience of the author, who teaches sport management and personal management in sport, the modes which are currently used to increase students' perception of the theory and practice regarding the organizational culture in the studies of sport management are described.

THE STUDY

When examining the modes of teaching and learning strategies of organizational culture in sport management, the body of knowledge and learning outcomes should be clarified at the beginning. What should be taught and how? We have to address the different issues of organizational culture education such as goals and learning outcomes, core content, good practices relating to pedagogy and availability of resources to support this education.

Examination of the concept of organizational culture and its manifestation in sport organizations can help to define the content of what should be taught and within which subjects, which are traditionally part of the sport management curricula. Culture manifests itself in sport organizations via different means. Activities of sport organization reflect its culture, i.e. types of values, beliefs and basic assumptions that the members of the sport organizations respect and pursue. Culture is a set of tangible and intangible characteristics which represents a particular sport organization and creates the behaviour of its members. When comparing with other business organizations in sport there are plenty of stories, myths, symbols and rituals on which the unique tradition and

current state of sport organizations are based. In addition, the particular sport and respective sport organization (usually sports club) is very often perceived through its language, slogans, physical settings and artifacts. To understand the organizational culture, a different subculture of sport can be difficult for pure observers, as indeed the students are. Therefore studying the principle manifestation of organizational culture in detail using a qualitative approach can be of great help. Even more challenging, this process could be in non-profit and public sport organizations as far as they have different purpose (Nová, 2013c). But in some instances they play a crucial role when it comes to conveying the meaning, perception and adoption of sport values to, and within, the respective community (small non-profit clubs oriented towards participatory sport products). In other words it means that when we are searching for what creates the body of knowledge of organizational culture in sport organizations attention should be paid not only to well-known sport business companies or professional clubs, but the variety of public and non-profit organizations which exist in the sport industry deserves special attention. As far as they are not so skilled in their public presentation they tend to be overlooked and so too their cultural aspects. The dimensions of organizational culture in sport are set by the sector of the sport (Hoye et al., 2012) as is shown in Figure 1.

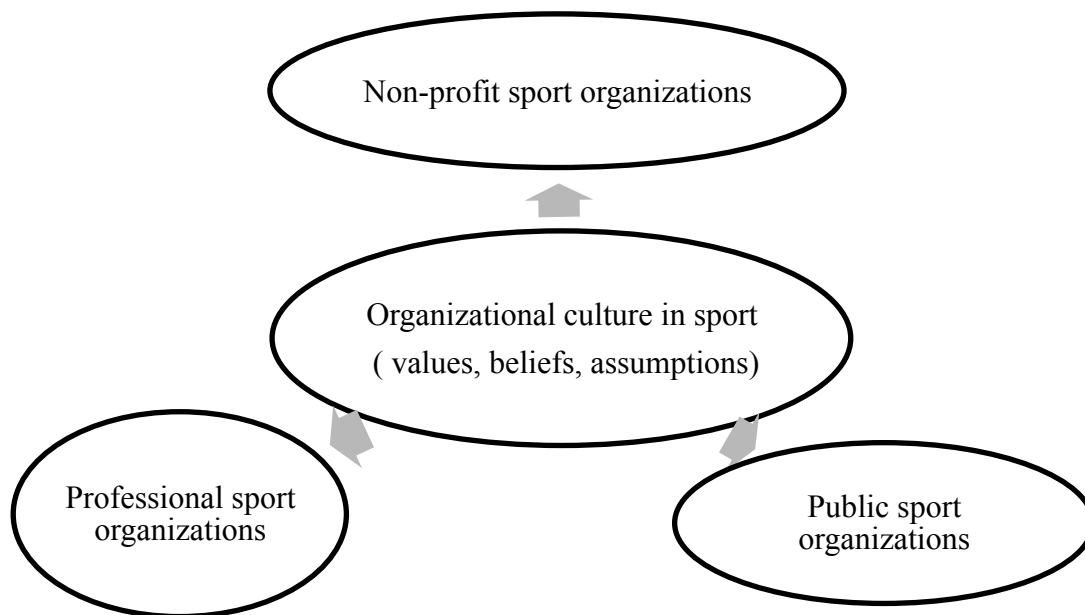


Figure1 Organizational culture in a sport context

On the basis of the previous discussion the respective learning outcomes can be defined as follows:

- to be able to analyze, develop and manage the appropriate and sustainable organizational culture in different kinds of sport organizations
- to demonstrate the knowledge of the tangible and intangible characteristics of OC in different kinds of sport organizations
- to analyze and manage critical incidents and organizational crises
- to demonstrate the ability to set the appropriate forms of organizational justice, namely distributive, procedural and interactional (Taylor et al., 2008)
- be able to diagnose, measure, control and reinforce the important aspects of organizational culture

Demonstration of learning achievements can be made via course embedded measurement or stand-alone testing or performance. To make sure that students are equipped both to understand the topic and to manage OC, sufficient time should be allotted for assessing students' learning.

The achievement of these learning outcomes is highly dependent on the teacher's and students' personality and values they hold and praise. But appropriate teaching and learning strategies can reinforce the adoption and perception of the values, beliefs and assumptions which are of the utmost importance in sport organizations. These can be summed up by the concept of good governance, as defined by Beech and Chadwick (2004) and which encompasses values such as transparency, accountability, democracy, responsibility, equality, performance and efficiency. Everyone who participates in sport should play their role – individuals as spectators, fans, governments, teachers and coaches, athletes and others who help them, referees, commercial agents, media, sports federations and the managing authorities. The principles of good governance in sport should be applied primarily by the new generation of sports managers (Nová, 2013a).

FINDINGS

The organizational culture of sport organization is taught at the Faculty of Sport Studies, Masaryk University in Brno, Czech Republic within the study programme called Sport Management. The programme is delivered in the cooperation of two faculties (Sport Studies and Faculty of Administration). Knowledge of organizational culture is taught in different subjects and a year's study and from different perspective, see [Table 1]. The approach towards teaching organizational culture is interdisciplinary and based on what students already know about the field. It requires flexibility in how to deliver the issue of OC and adjust the courses content accordingly.

Table 1: Delivery of the knowledge of organizational culture in Sport Management at FSPS MU

Subject /Course taught in Sport Management Studies	Content related to the organizational culture (OC)
Basic of Management	Definition and basic characteristics of OC
Management in Sport	OC in sport context
Human Resources Management in Sport	Dimensions of OC vs HRM strategies and policies
Case Studies in Sport Management	Reflection and Application of OC theory in practice

Teaching and Learning methods

The difficulties in teaching organizational culture are related to the fact that students are embedded with taken – for–granted values and stereotypes that they are exposed to by media coverage and traditional managerial practices in sport organizations. These assumptions and prejudices should be permanently challenged and questioned by using various teaching and learning methods.

Sport Management students are influenced by popular understanding of organizational culture in sport as such. In the first year of their study they are offered basic information with regard to the concept of OC. This basic understanding is further developed in the course, Management in Sport, where students are supplied by the outcomes of the studies of how OC manifests itself in different sport contexts. At this point the critical thinking about the concept of organizational culture in various sport organizations is supported. Group discussion, videos, articles and newspapers are used. In this way the awareness of values and beliefs that underlie the desired organizational culture is built among the students. Special attention is paid to the utilization of visual media (videos, life news...). This is very much in tune with the Champoux (1999) film studies theory, which stresses the teaching functions of film as case, experimental exercise, metaphor, satire, symbolism, meaning, experience and time. The assignments are required to be elaborated in order to reflect the reality, i.e. how organizational culture is manifested in non-profit organizations. The educational purpose of this kind of student work is to examine their confidence with this challenging topic.

Students' works analysis

The assignments of 29 undergraduate students who passed the Basics of Management and Sport Management courses were examined. The examination was guided by the following questions:

- To what extent can the students apply critical thinking with regard to organizational culture in the chosen sport organization? and
- What taken–for–granted assumption with regard to organizational culture in the sport organization might influence their ability to assess the dimensions of organizational culture?

Looking at the data quantitatively, a few characteristics of organizational culture in non-profit sport organizations dominated in the students' works [Table 2, 3].

Table 2: Mapping the kind and number of tangible manifestations (TM) of organizational culture in non-profit sport organizations (students' assignments in the course Sport Management)

Kind of TM	Number	Kind of TM	Number
Logo (colours)	22	Language	6
Sport jerseys	8	Rituals	13
Documents	7	Merchandize	5
History	4	Tales	6
Mascots	1	Anthem	1
Environment /premises	17	Website	2
Artefacts	3	Special Rules	2
Fun Club	2	Legends	15

In Table 2 it is visible that, when analyzing the tangible characteristics of organizational culture, students were heavily influenced by taken–for–granted assumptions with regard to organizational culture. Logos, rituals and legends have been identified most frequently and this corresponds with the traditional perception of organizational culture as such. The positive feature is that among these tangible characteristics students

mentioned also the environment and premises within which non-profit sport organizations operate. In a sport context sport facilities really represent a significant manifestation of organizational culture. Surprisingly students did not pay much attention to the websites, fun clubs and special rules although they manifest in complexity a lot of characteristics of a particular culture in sport organizations. For the teacher this indicates that the teaching and learning materials in each of the study courses in sport management have to be enriched by new materials which would emphasize these taken-for-granted features of sport organizations in the context of what they manifest in term of organizational culture.

The content analysis of students' assignments using a coding method (Strauss and Corbin, 1998) and Atlas.ti software was conducted so to provide an overview of students' perception of all tangible manifestation of OC.

Although the frequency of some manifestations (logos, environment, rituals and legends) was quite high in students' assignments, the coding hierarchy perspective as presented in Figure 2 (Network in open coding using the Atlas.ti software) offers a different perspective with regard to the grouping of tangible manifestations. Thus it also offers a valuable contribution to teachers in terms of the proper logic for grouping the teaching materials for the education of organizational culture.

Figure 2 Graphics of open coding of students' assignments (output from Atlas.ti)

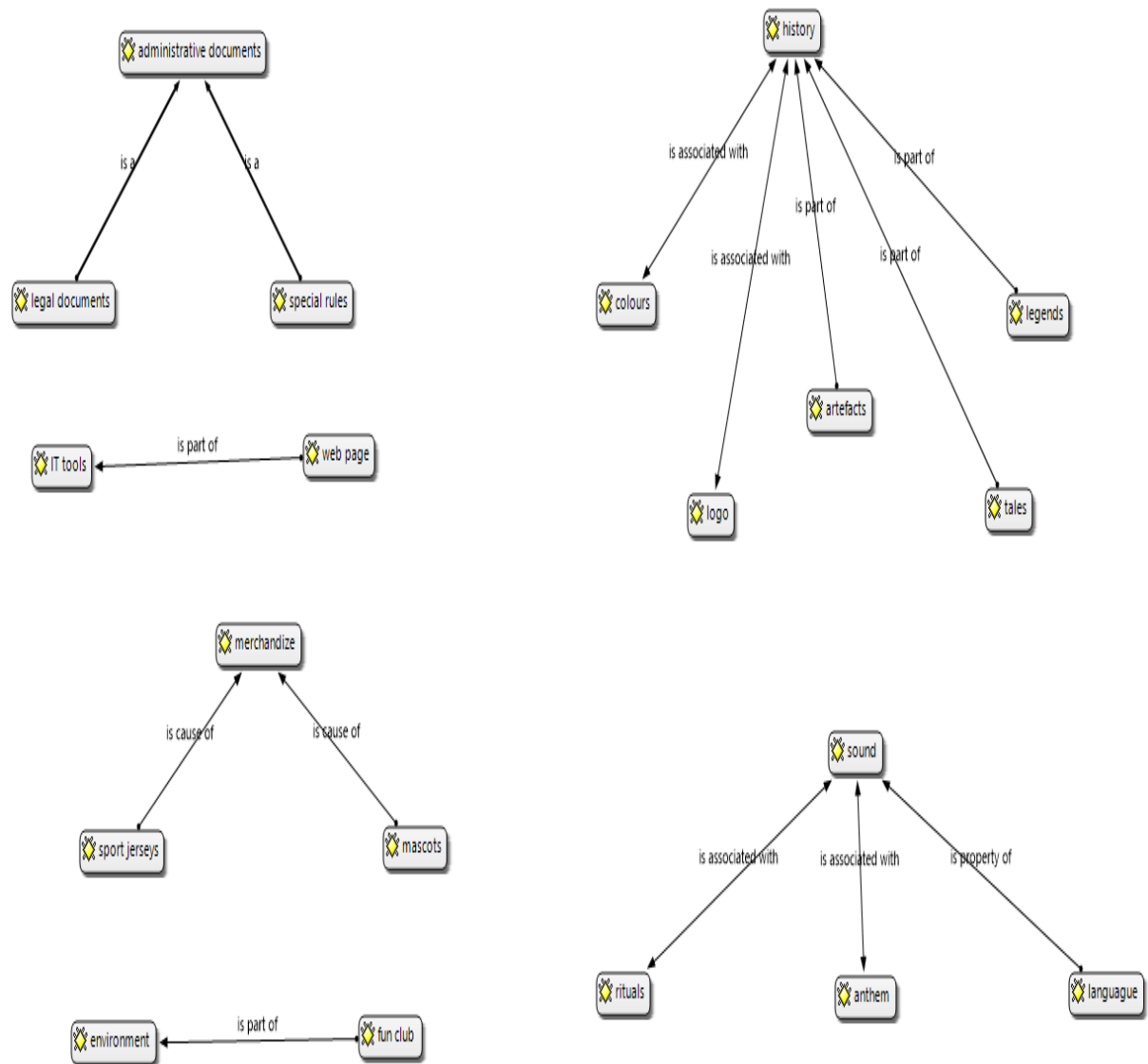


Table 3: Types of culture according to Handy (1985) as identified by students in the assignments in the course Sport Management

Type of culture	Number of sport orgs. where this culture was identified
Power culture	2
Role culture	3
Task culture	7+3 mixed with person, power and role culture
Person culture	12

From Table 3 it is obvious that 27 out of 29 students were able to include the organization to specified types of organizational cultures and they were also able to apply critical thinking with regard to the organizational culture in the chosen sport organization. In their assignments they used sound arguments for justifying their decisions. But in some instances they also stated that the specified classification of cultures as suggested by Hoyer et al. (2012) and defined by Handy (1985) does not reflect the realities in non-profit sport organizations. For the teacher this indicates that a new classification should be used when teaching organizational culture in a sport context. The classification suggested by Coyer (2000, In: Scott, 2014) which uses the approach of four-dimensional competing values for analyzing organizational culture, namely clan, adhocracy, market and hierarchy culture could be used. In addition the 26 individual and group assignments of the postgraduate students who passed the course, Case Studies in Sport Management were examined. These students could choose any problematic area in any sport management organization. The Atlas.ti software open coding [Table 4] and the Word Cruncher analytical tool were used to analyze qualitatively their assignments. For the analysis we used the same portfolio of open codes that we used in previous analysis. The topics of the assignments varied from organizational, financial and marketing issues to more sensitive topics such as the occurrence of domestic violence in elite sportspersons' households. But we noticed that although the issue of organizational culture is perceived by 95 % of them as a problematic area, only 5 % of them have been able to identify the nature of the characteristics of organizational culture which cause and influence the solution of the problem. The word culture and its derivate were explicitly stated in just 11 assignments (see Figure 3).

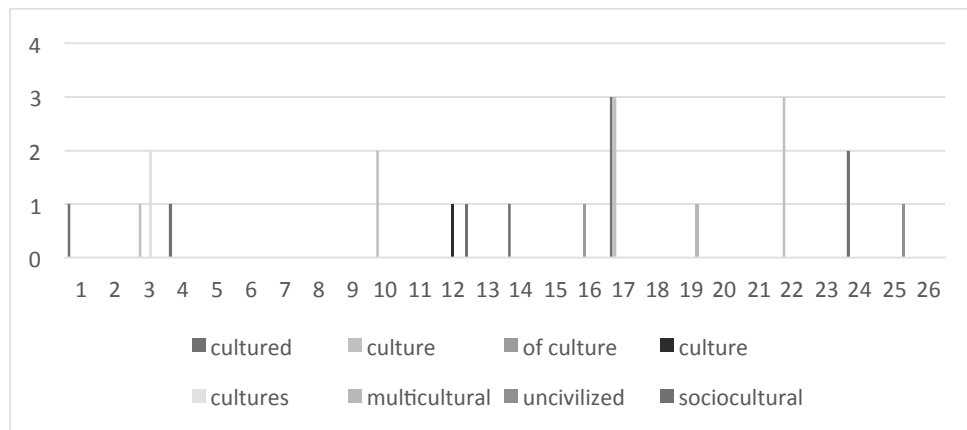


Figure 3 The occurrence of the word culture and its derivate in students' case studies (output from Atlas.ti Word Cruncher)

Table 4: Mapping the kind of tangible manifestations (TM) of organizational culture and the number of related quotations students' assignments in the course Case Studies in Sport Management

Kind of TM (code)	Number of quotations	Kind of TM (code)	Number of quotations
Logo (colours)	4	Language	4
Sport jerseys	3	Rituals	5
Documents	7	Merchandise	8
History	21	Tales	4
Mascots	0	Anthem/sound	3
Environment /premises	28	Website	15
Artefacts	0	Special Rules	9
Fun Club	5	Legends	15

In addition to the above-mentioned characteristics of organizational culture in the case studies new characteristics were mentioned such as values (66 quotations), reputation (23 quotations) and IT tools (17

quotations).

Although the occurrence of the open codes related to organizational culture is quite high see [Table 4], the students were not able to attribute exactly the problematic managerial incidents to the particular area and characteristics of organizational culture. Although at the semester students had an opportunity to discuss and solve a few case studies which were directly related to the topic of organizational culture, it seems that they were not able to apply and demonstrate understanding of the theoretical background regarding this topic in their assignments. For the teachers it means that particular attention should be paid to the development of the appropriate design of the case studies (Nová, 2013b) and that the learning process via teaching case studies could be reinforced by the personal traits of the current student population – Y generation (Millennials).

CONCLUSIONS

Although research in sport organizational culture has been conducted over the last two decades across several organizational types, there are no studies available that shed light on how sport management students understand or are taught this challenging topic. This qualitative case study offers an initial exploration of how organizational culture is learned and taught in sport management studies. Teaching and Learning Strategies which can be most successful in this sense are described, so to successfully achieve the intended learning outcomes. After careful analysis of the transcripts from the undergraduate students' seminar work, their perception of organizational culture in a real sport context was examined. This will allow designing a new, more strategic approach to the teaching of organizational culture in sport management studies. But prior to this, further research is needed to explore how other sport management programmes approach the teaching of organizational culture. Educators, students and researchers should be aware of the fact that the majority of the research in sport management with regard to organizational culture is linked to professional sport, academic leagues and fitness organizations, whereas non-profit sport organizations have been overlooked. This dominance can be minimized in the teaching process by discussing the wide range of perspectives of organizational cultures and subcultures that exist in non-profit and public sport organizations. Students should be exposed to the changing nature of organizational values and beliefs in the context of sport in relation to critical incidents (i.e. FIFA corruption scandal) or to political power changes at national, local and club level (influence of short-termism of politicians and board members' intentions with regard to sport). Students should be given the opportunity to capture the complexities of the internal and external environment so to understand the importance, content and context of today's and future organizational culture in sport organizations. After completing the sport management studies, students must be able to assess the benefits and limitations of the different types of organizational culture in various sport contexts and therefore this exploratory study should be followed by research on how educators, practitioners and students view the teaching of organizational culture. Further discussion should take place among the academic community in sport management so to justify the need for a stand-alone course in organizational culture or integration across the curriculum. The problematic areas with this regard could be lack of a body of knowledge as well as lack of trained faculty/ staff so as to establish the independent course which will be taught professionally. Even more challenging, as we showed in our paper, remains the issue of establishing assessment/ measurement metrics with regard to the teaching of organizational culture.

References

- Beech, J., & Chadwick, S. (2004). *The business of sport management*. Harlow, United Kingdom: Pearson Education
- Frontiera, J. (2010). Leadership and organizational culture transformation in professional sport. *Journal of Leadership and Organizational Studies*, 17 (1), pp.71-86.
- Handy, C. B. (1995). *Gods of management: The changing work of organizations*. New York, NY: Oxford University Press
- Hoye, R., Nicholson, M., Smith, A., Stewart, B., & Westerbeek, H. (2012). *Sport Management: Principles and applications* (3rd Ed.). Abingdon, United Kingdom: Routledge.
- Commission on Sport Management Accreditation (2010). Accreditation Principles and Self-Study Preparation. Reston, VA: Commission on Sport Management Accreditation.
- Champoux, J.E. (1999). Film as a Teaching Resource. *Journal of Management Inquiry*, Vol. 8, No. 2, pp.206-217.
- Kent, A. & Weese, W.J. (2000). Do effective organizations have better executive leaders and /or organizational cultures? A study of selected sport organizations in Canada. *European Journal of Sport Management*, 7, pp. 4 - 21.
- MacIntosh E.W. & Doherty, A. (2010). The influence of organizational culture on job satisfaction and intention to leave. *Sport Management Review*, 13, pp.106-117.
- NOVÁ, J. (2013a). The concept of the good governance and its impact on the academic standards in sport education. In XII ENSSEE Forum. 2013
- Nová, J. (2013b). The role of the teaching case studies in the sport management education. *In Sport and Quality*

- of Life* 2013. Brno: Masarykova univerzita, 2013. ISBN 978-80-210-6640-3, s. 319-328. 7.11.2013, Brno.
- Nová, J. (2014). *Management sportu – teorie, případové studie, kvalita*. doi:10.5817/CZ.MUNI.M210-6781-2014.
- Schein, E. H. (2010). *Organizational culture and leadership* (4th Ed.). San Francisco, CA: Jossey-Bass Publishers.
- Slack, T. & Parent, M., M. (2006). *Understanding sport organizations: The application of organization theory*. Second Edition. Champaign, IL: Human Kinetics
- Scott, D. (2014). Contemporary leadership in sport organizations. Champaign, IL: Human Kinetics
- Strauss, A. & Corbin, J. (1998). *Basic of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Sage Publications. Thousand Oaks. California
- Taylor, T., Doherty, A., & McGraw, P. (2008). *Managing people in sport organizations: A strategic human resource management perspective*. London, United Kingdom: Butterworth-Heinemann.
- Weese, W.J. (1995a). Leadership and organizational culture: An investigation of Big-Ten and Mid-American Conference Campus recreation administrators. *Journal of Sport Management*, 9, pp. 119-134.
- Weese, W.J. (1995b). Leadership, organizational culture, and job satisfaction in Canadian YMCA organizations. *Journal of Sport Management*, 9, pp. 182-193.
- Weese, W.J. (1996). Do leadership and organizational culture really matter? *Journal of Sport Management*, 10, pp. 197 - 206.
- Westerbeek, H.M. (1999). A research classification model and some (marketing oriented) reasons for studying the culture of sport organizations. *European Journal of Sport Management*, 6, pp. 69-87.
- Web Resources**
- Nová, J. (2013c). Current Concepts of the Quality in Sport and their Utilization in the Czech Republic. *Ekonomika a management*, 2013(4). Retrieved from <http://www.ekonomikaamanagement.cz/getFile.php?fileKey=CEJVB0NUCAvCEZIU1VHB0MIUUMEBAVDVFVWQ1VUBAVGQ1VCXgQFBERIREFAZQ==&lang=cz>.
- The Quality Assurance Agency for Higher Education. UK. (2008). Subject Benchmark Hospitality, leisure, sport and tourism. <http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Hospitality-leisure-sport-tourism-2008.pdf>

Evaluating And Monitoring The Learning Progress: Learning Analytics

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ABSTRACT

Within educational society, metrics and grades (e.g., standardized-tests) are commonly being employed to assess the knowledge, skills and educational achievement that can be measured according to specific criteria or standards. This traditional practice of assessment is currently being replaced with an emerging and promising measurement technique for learning processes, that is, Learning Analytics. With the help of innovative ICT-enhanced applications, learning analytics has already been utilized to apply a process of gathering and analyzing large amounts of data about learning progress for purposes of understanding and optimizing learning experiences and environments. In this paper, we discuss the notion of learning analytics that presents a paradigmatic change in the measurement, collection, analysis and reporting of data about making decisions to improve the learning process.

INTRODUCTION

We have been witnessing the emergent of innovative techniques and applications within the learning and teaching processes in parallel to the rapid developments in information and communication technologies. The new methods or techniques in the measurement of learner success are one of those, which have been affected in the sense of practice and idea by new technologies. The traditional practice of assessment is currently being replaced with an emerging and promising measurement technique particularly for ICT-supported learning processes. Actually, a need for assessing the knowledge, skills, behaviors and educational achievement of “the net generation” learners has been conspicuously recognized by the educators and researchers. It is due to the fact that the net generation learners live in a world of high technological sophistication, which is their medium and métier (Hughes, 2009) that is “integral to the world they know and that world is the only one they have known.” (Hughes, 2009, p 39).

“The new technologies emerging with this generation have particular characteristics that afford certain types of social engagement” (Jones, 2011, p.42) and consequently, a new learning experience. This includes a “strong sense of group identity; and a disposition to share and to participate[;]...a preference for instant answers; a downgrading of text in favour of image; and a casual approach to evaluating information and attributing it” (Hughes, 2009, p 39). The new usage of and accessibility to technology anytime anywhere even during mobility has changed school practices, learner expectations and experiences. Learners have increasingly developed as being equipped with the ability of self-controlled learning and the attitude of life-long independent learning. This has also lead to new trends in education such as mobile learning, open educational resources, virtual learning, cloud computing, and learning analytics. “Learning analytics has emerged as one of the most common terms for the community seeking to understand the implications of these developments for how we analyse learning data, and improve learning systems through evidence-based adaptation” (Buckingham Shum, 2012, p.2).

LEARNING ANALYTICS DEFINITIONS & CONCEPTS

Learning analytics (LA) is a fast growing field of ICT-supported learning and teaching. Learning analytics is defined on the website of the first international Conference on Learning Analytics and Knowledge (LAK 2011) (<https://tekri.athabasca.ca/analytics/>) and adopted by the Society for Learning Analytics Research (SoLAR) as “The measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environment in which it occurs.” Siemens (2010) defines learning analytics as “the use of intelligent data, learner-produced data, and analysis models to discover information and social connections, and to predict and advise on learning.”

According to Johnson et al. (2011), Learning Analytics “refers to the interpretation of a wide range of data produced by and gathered on behalf of students in order to assess academic progress, predict future performance, and spot potential issues” (p.28). Based on this definition, learning analytics has a potential in helping us “evaluate past actions and to estimate the potential of future actions, so to make better decisions and adopt more effective strategies as organisations or individuals. Analytics allows us to increase the degree to which our choices are based on evidence rather than myth, prejudice or anecdote.” (Cooper, 2012, p. 3). According to Phil

Long and George Siemens (2011), “[t]he idea is simple yet potentially transformative: analytics provides a new model for college and university leaders to improve teaching, learning, organizational efficiency, and decision making and, as a consequence, serve as a foundation for systemic change” (p. 32).

Based upon the definitions above, it could be summed up that learning analytics could be positioned and conducted in terms of 3 different time scales: past, present, and future which provides information as well as insights and understanding for each time frame (Davenport et al., 2010) (see Table 1). LA could produce reports and descriptions about what happened in the learning stage and try to understand the reasons how and why actions in the past of learning process took place by building models and explanations. Moreover, LA provides near-real time information about what is happening in the current learning process and correspondingly, various recommendations are provided to take the best next action. Furthermore, LA analyzes the past data and produce new information about patterns of learning process leading to a point. LA makes predictions about the effect of actions and identifies the optimal interventions in the learning process.

Table 1. Analytics Position (adapted from Davenport et al., 2010)

	ANALYTICS POSITION		
	PAST	PRESENT	FUTURE
INFORMATION & FACT	Analytics produces <i>Reports & Description</i> of data: What happened?	Analytics <i>Alerts</i> : What is happening now?	Analytics <i>Extrapolates past data</i> : Where are trends leading?
INSIGHTS & UNDERSTANDING	Analytics builds <i>Models & Explanation</i> : How and why did something happen?	Analytics provides <i>Recommendations</i> : What is the best next action?	Analytics provides <i>prediction</i> , simulates the effect of alternative courses of action, or identifies an optimal course of action: What is likely to happen?

Data-driven approach or data-driven decision-making processes for the purpose of understanding and improving learning currently stimulate interest in making more use of learning analytics. However, since the term “learning analytics” is kind of a newborn term for actors in education, it is interchangeably used with other terms such as “educational data mining” or “academic analytics” which have roots from data mining, business intelligence and statistics fields.

Educational Data Mining has emerged from the field of data mining as a database research field specifically in education for the last 10-15 years (Buckingham Shum & Ferguson, 2011). Ferguson (2012) views educational data mining as it focuses on mainly the technical challenge of education, that is, the possible ways of extracting a value from big sets of learning-related data. On the other hand, Learning Analytics focuses on the educational challenge where educators try to optimize opportunities for learning (Ferguson, 2012). Educational Data Mining, in other words, focuses more on research – data retrieval and analysis through the processes of, for instance, clustering, classification, sequence mining, social network analysis. One of the key application areas of *Educational Data Mining* is to look for “empirical evidence to refine and extend educational theories and well-known educational phenomena, towards gaining deeper understanding of the key factors impacting learning, often with a view to design better learning systems.” (Baker & Yacef, 2009, p.7).

In terms of *Academic Analytics*, Ferguson (2012) emphasizes its focus on the political or economic challenge, which seeks for considerable improvements in learning opportunities and educational results at national or international levels. *Academic Analytics* provides solutions based generally on data analysis at an institutional level whereas *Learning Analytics* look for relationships within learning process (e.g. teacher, learner, content, and learning context). The most common users of analytics in higher education today are administrative units in education employing it as an engine to make decisions or guide actions (Campbell & Oblinger, 2007).

LEARNING ANALYTICS PROCESS

Chatti, et al. (2012) proposes a LA process as an iterative cycle in three major steps: i) data collection and pre-processing, ii) analytics and action, and iii) post-processing (see figure 1). The first step in this model is

collecting data and according to the type and size of the data, pre-processing data techniques such as data cleaning, data integration, data transformation, data reduction, data modeling take in place. The second stage – analytics and action - is to discover the data and explore the hidden patterns to improve the learning experience by means of actions including “monitoring, analysis, prediction, intervention, assessment, adaptation, personalization, recommendation, and reflection” (Chatti, et al. 2012, p.6). The third stage – post-processing – is critical for continuous improvement. This stage involves “compiling new data from additional data sources, refining the data set, determining new attributes required for the new iteration, identifying new indicators/metrics, modifying the variables of analysis, or choosing a new analytics method.” (Chatti, et al. 2012, p.6).

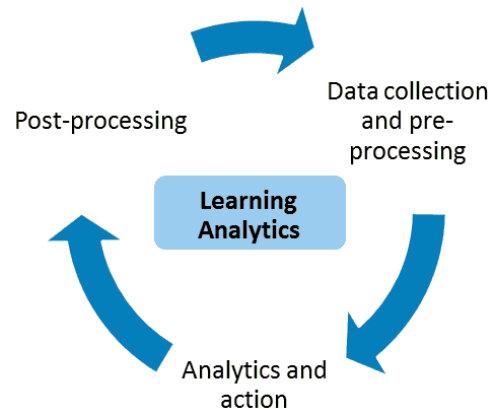


Figure 1. Learning Analytics Process (Chatti, et al. 2012)

George Siemens (2010) suggests another LA process, which is not an iterative process but more like a structured equation modeling (see figure 2). In a technology-enhanced learning environment, learners constantly create and input data via different tools such as learning management systems, blogs, or other social media. The data supported with learner’s profile and becomes increasingly an interlinked or intelligent. Then, analysis takes in action to make predictions for personalization, adaptation of the learning process, and to do interventions for effective learning outcomes. Within this mind, “adaptation and personalization needs to be holistic and multi-faceted, incorporating technology, socialization, and pedagogy” (Siemens, 2010).

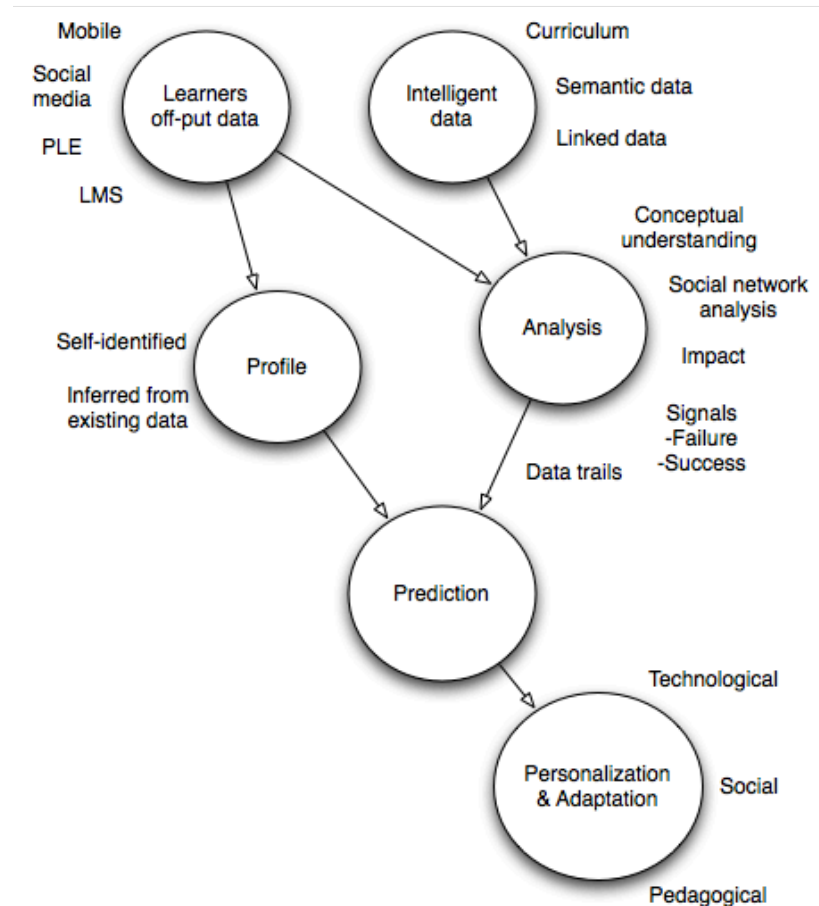


Figure 2. The Process of Learning Analytics (Siemens, 2010)

THE IMPLICATIONS OF LEARNING ANALYTICS

Learning Analytics is relatively a new technique for analyzing huge data sets to both redirect learners to more successful learning experiences and provide help and guide to redesign curricula for more successful learning opportunities. Huge data set is recurrently named as “big data” that is collected by different ICT tools, for instance, Learning Management Systems. So what is big data called? “Big data is a buzzword, or catch-phrase, used to describe a massive volume of both structured and unstructured data that is so large it is difficult to process using traditional database and software techniques” (www.webopedia.com/TERM/B/big_data.html).

Structured data is generally stored in databases in a standardized storage format and ontology (e.g., load, enrollments, usage data). Unstructured data including text, audio, lecture videos, chat rooms, emails often requires pre- processing before facilitating structured data analysis. These sorts of data provide valuable real time information by analyzing usage-tracking data for different stakeholders in the field of education in terms of student behaviors, student interactions and course content design. Educators and learners are two critical stakeholders among others (e.g., computer agents, institutions, instructional designers, LA researchers) that they can have many educational benefits of LA. According to Sharples et al. (2013), LA provides an innovative way of assessing and exploring the milestones of the learning progress for educators and learners (see table 2).

Table 2. Educational Use of Learning Analytics (Sharples et al., 2013, p.14)

Educators can use LA to:	Learners can use LA to:
<ul style="list-style-type: none"> • Monitor the learning process • Explore student data • Identify problems • Discover patterns • Find early indicators for success, poor marks or drop-out • Assess usefulness of learning materials • Increase awareness, reflect and self-reflect • Increase understanding of learning environments • Intervene, supervise, advise and assist, and • Improve teaching, resources and the environment. 	<ul style="list-style-type: none"> • Monitor their own activities, interactions and learning process • Compare their activity with that of others • Increase awareness, reflect and self-reflect • Improve discussion participation, learning behaviour and performance • Become better learners, and • Learn.

Of the above, monitoring the learning process, in particular, monitoring individual learner performance and participation in a course is among the most prevalent type of learning analytics applications. Disaggregating learner performance by selected characteristics (e.g., major, year of study, ethnicity, etc.) and identifying outliers for early intervention are the next frequent use of LA applications. However, predicting potentials within a course so that all learners have optimal achievements; identifying and developing effective and efficient instructional techniques; and testing and evaluation of curricula are the least types of LA applications that educators prefer to utilize.

CHALLENGES and DEBATES

Theoretically, Learning Analytics provides interventions for the existing models and shortcomings of education and produces new insights what works successfully and what needs to be improved or developed in teaching and learning (Siemens, 2012). However, there are considerable challenges and uncertainties that educators face with especially having the potential impact of LA on education and learning. Ferguson (2012) identifies four significant challenges: i) integrating experience from the learning sciences, ii) working with a wider range of datasets, iii) engaging with learner perspectives and iv) developing a set of ethical guidelines. According to Ferguson (2012), the first challenge is that educators and/or researchers need to build strong connections with learning sciences as LA has emerged from many other fields (e.g., data mining, academic analytics). Another challenge is that researchers need to develop methods to investigate problems faced by learners in different learning contexts and to work with a wide range of datasets. Moreover, researchers need to develop analytics focusing on the personalized learning, that is, perspectives of learners rather than to the needs of institutions. Furthermore, researchers need to develop and apply a clear set of ethical guidelines for learners in relations to their data.

Buckingham Shum (2012, p.9) also put very much emphasis on the following challenges for applying LA in the field:

1. Learning Analytics are never neutral: they unavoidably embody and thus perpetuate particular pedagogy and assessment regimes in the educational ecosystem (primary/secondary/tertiary/workplace).
2. There is a pressing need to plug the widening analytics talent gap. Institutions should train staff and researchers in the design and evaluation of learning analytics.
3. Compared to many other sectors, educational institutions are currently ‘driving blind’. They should invest in analytics infrastructures for two reasons: (1) to optimise student success, and (2) to enable their own researchers to ask foundational questions about learning and teaching in the 21st century.
4. The field is moving fast, with companies innovating to meet perceived markets. To keep up, the normally slower pace of educational research and professional development must be accelerated, or institutions are at risk of making purchasing decisions based on what’s available, rather than what’s needed.

In addition, although Learning Analytics provides performance indicators for learning and teaching, it does not essentially promote meaningful learning. Moreover, analytics making learners increasingly reliant on institutions, which are dependent on computational platforms to be able to provide learners with continuous feedback, rather than developing learners' own meta-cognitive skills and dispositions (Buckingham Shum, & Ferguson, 2011).

Along with challenges, there are critiques and debates on the utilization of LA around the following issues:

- Automating Research Changes the Definition of Knowledge
- Claims to Objectivity and Accuracy are Misleading
- Bigger Data are Not Always Better Data
- Not All Data Are Equivalent
- Just Because it is Accessible Doesn't Make it Ethical
- Limited Access to Big Data Creates New Digital Divides (Buckingham Shum, 2012, p.8)

CONCLUSION

In an ICT-enhanced learning environments, learners produce data trails which could be valuable for making interpretations about what is actually happening in the learning process and creating suggestions and possible ways in which educators can make improvements with learning and teaching. LA also provides learners with insights into their own learning behaviors and performances. Learning institutions make little use of data learners left behind in the process of their interaction with ICT-enhanced learning contexts. Within this kind learning contexts, huge amount of data is constantly being generated and storage and processing power of data are exponentially available in courses. LA promises to be an important lens through which to view patterns of relationships hidden in that data and plan for effective change in learning.

Learning analytics have undeniably a crucial role to play in the future of education. Especially, understanding the scope and uses of learning analytics in existing courses will open new areas in relation to innovative learning designs and new teaching methods and curricula. Not only does LA provide about past actions in the learning but also supports future learning outcomes. On the other hand, the relationship of LA with theories of learning, teaching, cognition and knowledge should carefully be made.

Empirical research studies should be conducted and then findings need to be applied into practice in real learning contexts to evaluate the potential of LA. There is also a need to address challenges that learners, educators, institutions are facing with. "These challenges currently involve the development of new tools, techniques, and people; resolving data concerns such openness, ethics, and the scope of data being captured; enlarging and transitioning the target of analytics activity; and improving connections to related fields." (Siemens, 2012, p.4).

However, LA as a new discipline has already captured a tremendous interest and gained a vast attention among stakeholders in education with its offers and potential in improving the learning process and providing interventions for current educational problems at individual learner, teacher, and institutional level. "Learning analytics can penetrate the fog of uncertainty around how to allocate resources, develop competitive advantages, and most important, improve the quality and value of the learning experience." (Long & Siemens, 2011, p.40).

References

- Baker, R.S.J.d., Yacef, K. (2009). The State of Educational Data Mining in 2009: A Review and Future Visions. *Journal of Educational Data Mining*, 1 (1), 3-17.
- Buckingham Shum, S (2012). Policy Brief: Learning analytics. UNESCO Institute for Information Technologies in Education.
- Buckingham Shum, S. and Ferguson, R. (2011). Social Learning Analytics. Available as: Technical Report KMI-11-01, Knowledge Media Institute, The Open University, UK.
- Campbell, J. P., & Oblinger, D. G. (2007). *Academic analytics*. Retrieved May 31 from <http://net.educause.edu/ir/library/pdf/PUB6101.pdf>
- Chatti, M. A., Dyckhoff, A. L., Schroeder, U., & Thüs, H. (2012). A reference model for learning analytics. *International Journal of Technology Enhanced Learning*, 4(5), 318-331.
- Cooper, A. (2012). A Brief History of Analytics A Briefing Paper. *CETIS Analytics Series. JISC CETIS*. Retrieved June 3, 2015 from <http://publications.cetis.ac.uk/wp-content/uploads/2012/12/Analytics-Brief-History-Vol-1-No9.pdf>

- Davenport, T. H., Harris, J. G., and Morison, R. (2010). *Analytics at Work: Smarter Decisions, Better Results*. Harvard Business Press.
- Ferguson, R. (2012). Learning analytics: drivers, developments and challenges. *International Journal of Technology Enhanced Learning*, 4(5/6), 304–317.
- Hughes, A. (2009). Higher Education in a Web 2.0 World: Report of an Independent Committee of Inquiry into the Impact on Higher Education of Students Widespread Use of Web 2.0 Technologies. The Committee of Inquiry into the Changing Learner Experience (CLEX). Retrieved June 7, 2015 from <http://www.webarchive.org.uk/wayback/archive/20140614222117/http://www.jisc.ac.uk/media/document/s/publications/heweb20rptv1.pdf>
- Johnson, L., Smith, R., Willis, H., Levine, A., and Haywood, K., (2011). *The 2011 Horizon Report*. Austin, Texas: The New Media Consortium.
- Long, P., & Siemens, G. (2011, October). Penetrating the fog: Analytics in learning and education. *Educause Review Online*, 31–40.
- Jones, C. (2011). Students the Net Generation and Digital Natives: Accounting for Educational Change. In M. Thomas (Ed.), *Deconstructing Digital Natives: Young people, technology and the new literacies*. Routledge: New York.
- Sharples, M., McAndrew, P., Weller, M., Ferguson, R., FitzGerald, E., Hirst, T. & Gaved, M. (2013). *Innovating Pedagogy 2013*, Open University Innovation Report 2. Milton Keynes: The Open University.
- Siemens, G. (2010). What are Learning Analytics? Retrieved June 9, 2015, from <http://www.elearnspace.org/blog/2010/08/25/what-are-learning-analytics/>
- Siemens, G. (2012, April). Learning analytics: Envisioning a research discipline and a domain of practice. *Proceedings of the Second International Conference on Learning Analytics and Knowledge (LAK '12)*, 29 April–2 May, Vancouver, BC, Canada (pp. 4–8). New York: ACM.

Evaluation Of Sequence Card Activities Performed On Hearing-Impaired Preschool Children⁶

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ABSTRACT

This study aims to evaluate use of sequence card in literacy activities of preschool hearing-impaired children. The study designed as a case study. The data collected from preschool grade 2 in Research and Education Center for Hearing Impaired Children, Anadolu University, Turkey by using classroom observations, teacher interviews, documents, records of validity committee and reflective journal of the researcher. Findings of the study indicated that sequence card activities supported the vocabulary, awareness of story grammar, telling the main events in the story, predicting skills, relating the events in the story, sequencing and summarizing the events in preschool hearing-impaired children.

Keywords: Hearing-impaired children, literacy skills, sequence cards, pre-school period

INTRODUCTION

Preschool education occupies an important place in raising children, in that it provides them the opportunity to develop certain skills that form the basis of their future literacy skills. Skills that begin to develop during the preschool period and form the bases of initial literacy skills include awareness of word lengths and the shape of letters forming words (sight word), phonemic awareness, phonological awareness, semantics, and the utilization of syntax cues (Fields, Groth & Spangler, 2004; Gambrell & Mazzoni, 1999). During their preschool period, it is necessary and important to provide hearing-impaired children with literacy activities that will contribute to the development of the abovementioned skills (Williams, 1999). These literacy activities can include a broad range of activities such as story-telling to class, story reading, preparing big books, sharing/discussing events in sequence cards, matching-completing-sequencing activities, explaining subjects, using daily notebooks/diaries, singing, rhyming, play, and mathematics. In this study, we evaluated the use of sequence cards within the scope of literacy preparation activities.

Sequence Cards

Sequence cards are cards with drawings that illustrate a sequence of interrelated events that follow one another in a coherent manner, and which together form a story. The number of pictures in these cards varies between two and eight, depending on the events they describe and the language and knowledge level of the students. During the development of initial literacy skills for elementary school, sharing stories on a given subject with students through sequence cards contributed to the development of certain skills. By describing the events in sequence cards, children develop and improve their ability to express their thoughts, emotions, and experiences. Sequence cards provide children the opportunity to associate and think about different events, to perform comparisons, and to combine event with their own experiences. In addition, sequence cards not only support the development of children's vocabulary, but they also contribute to the development of their ability to describe events, to make predictions, to establish relationships between events, to gain an awareness regarding the construct of a story, to list/sequence events, and provide summaries (Girgin, 2001; Ingber & Eden, 2011). Being able to achieve the advantages associated with sequence cards depends on the suitability of the cards' subjects, plots, characters, and drawings for the children's age, class, language, and level of knowledge, and also on the emphasis placed in the abovementioned skills within the scope of educational activities/applications.

An evaluation of the literature shows that there is only a limited number of studies on sequence card activities performed with hearing-impaired children. In one study, Ingber and Eden (2011) used educational activities involving sequence cards to develop hearing-impaired children's ability to describe events in a sequence, and also to improve their story-telling skills. Based on the results of their study, they determined that the students' ability to describe the events in the proper sequence was associated with receiving early/preschool education, and that students with cochlear implants had better story-telling performance than students using hearing aids. In another study, Eden (2010) evaluated the differences among hearing-impaired kindergarten and school age children with regards to their perception of time sequences. The results of this study showed that the best time perception performances were obtained when pictures were used, while the lowest performances/outcomes were observed when written texts were used. To the best of our knowledge, there are no previous studies in Turkey regarding the use of sequence cards for hearing-impaired students. We believe that the results of the current study will serve as a guide concerning the use of sequence card activities within the frame of literacy preparation

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activities performed for-hearing impaired children. The aim of this study was to evaluate the sequence card activities performed with the context of preschool literacy preparation group activities with hearing-impaired children.

METHODS

Study design

In this study, the qualitative case study model was used to evaluate how sequence card activities were conducted within the frame of literacy preparation activities. The case study represents a study method in which the investigated case is evaluated within its own environment, thereby enabling the description, explanation, and assessment of the relevant case (Yin, 2009).

Educational environment in which the study was conducted

The study was conducted at the preschool 2nd grade of the Research and Education Center for Hearing Impaired Children (İÇEM) affiliated with Anadolu University. İÇEM is a special educational institution where the natural auditory/oral approach is implemented, and where hearing-impaired children are diagnosed and implanted with devices at an early age. In addition to family/parent education, İÇEM provides preschool, elementary school, middle school, and high school day education for hearing-impaired children. Hearing-impaired children begin the first year of preschool starting from the age of 3, and then continue by attending the second and third years of preschool. At each grade level, the children receive both group classes and individualized education for a full day period.

Study Participants

The study participants included two teachers working at İÇEM's preschool 2nd grade during the 2012-2013 academic year, and the researcher. The teachers were graduates of the Field of Special Education, Department of Teaching for the Hearing-Impaired. The teachers had nine and four years of experience working at İÇEM's preschool classes. The researcher has been studying the development and assessment of literacy skills among hearing-impaired preschool, elementary school, and middle school children.

Data collection tools

The study data were primarily obtained through in-class observations, interviews with the teachers, and by using the researcher's diary. Other forms of data sources used within the scope of this study included class-related documentation and the records of the validity committee.

Data collection and analysis

The study data were collected during the 2012-2013 academic year, between September 17, 2012 and January 25, 2013. The researcher directly observed the in-class literacy preparation activities performed in the preschool 2nd grade, and recorded how the teaching materials were used and the class was taught. Following this, the researcher recorded collected and recorded the class materials, the non-formal evaluations used by the teachers, the class programs, and the relevant audiological information.

In case studies, data analysis is performed both while the study is still ongoing and after all the relevant data are collected. In qualitative case studies, an analysis of the study data is performed by identifying themes and using descriptive analysis (Yıldırım & Şimşek, 2011). In this study, the obtained data were described and analyzed through the identification of the relevant themes.

Validity and Reliability

Validity and reliability evaluations were performed during the data collection and analysis stages by two field experts. During the validity and reliability process, various data collection tools were used to collect data, and the obtained data were evaluated by a reliability committee. Following this, the themes identified during the data analysis stage were controlled.

RESULTS

This study involved the evaluation of sequence card activities performed by hearing-impaired preschool children within the frame of literacy preparation group activities. Between September 2012 and January 2013, a total of 18 sequence card activities were performed at the preschool 2nd grade of İÇEM. The number of pictures on the sequence cards varied between four and six, and the duration of each one of these activities were between 30-35 minutes. It was noted that the subjects of the used sequence cards were parallel with the subjects covered in class. By selecting and using sequence card suitable for the class' subject, the children were able to use the words they newly learned in different stories and contexts. This not only allowed the children to improve their vocabulary, but also provided them the opportunity to make better use of syntax, to better understand the meaning of words within sentences, and to utilize cues regarding the use of words (Ingber & Eden, 2011).

An evaluation of the activities and practices implemented during the study period revealed five different themes, which were: (a) the explanation of the sequence cards' subject by the teacher; (b) the showing and sharing of the pictures on the cards in a certain sequence; (c) the teacher asking the children their predictions about the next picture; (d) establishing cause and effect relationships between events; and (e) the summarizing of the events, and the repetition of the pictures' content by the students. Sequence cards are stories with certain characters, locations and times, and where the events are described according to a certain sequence. Sharing these stories during group activities serves to increase and expand the children's knowledge regarding the language and structure used in stories. Gaining an awareness of story structures has an important role in the development of reading comprehension (Girgin, 2001). During sequence card activities, the description provided by the teacher on the subject of the cards allows the children to develop an awareness concerning the relevant story's structure (Ingber & Eden, 2011). In this study, it was observed that the teachers began each sequence card activity by first explaining the subject of the story. In sequence card activity, the showing of pictures in a certain sequence, the descriptions provided by the children, the descriptions provided by the teacher, and the questions-and-answers session regarding the subject of the cards all play an important role. The ability to describe the events in a text in the proper order, and the understanding and answering of questions regarding the text, and occupy an important place in formal literacy education. These abilities/skills are gained and developed based on another set of skills, which include the ability to understand events verbally, the ability to understand questions, and to match them correctly with answers, and the ability to express answers verbally (Girgin, 2001). In this study, it was observed that during the sequence card activities, the events in each picture were shared with the children (according to the story's own sequence), and that the children were given the opportunity to present their own explanations/descriptions regarding these events. The teachers also shared their own explanations/descriptions, and asked the children various question concerning the events; the teachers also shared the answers given by each children with the rest of the group. Sequences cards represent a method that gives children the opportunity to make predictions, and to identify the correct relationships between events. Establishing relationships between events, making predictions, and summarizing are important literacy strategies that are also used in formal literacy education (Schirmer, 2000). The practices observed during this study showed that while events were being shared and described by the teacher, the children were not only given the opportunity to make predictions, but were also prompted to make predictions through questions asked by the teachers. It was also observed that the children were shown the direct relationships between events, and that the events shown in the cards were summarized to them at the end of the activities.

CONCLUSION and RECOMMENDATION

In this study, it was observed that sequence card activities, performed within the frame of literacy preparation activities, were selected according to the class' current subject, and that these activities supported the development of the children's vocabulary; awareness regarding the structure of the story; ability to describe, predict, and establish relationships between events; and the ability to list the sequence and summarize events. Based on the study results, it is possible to recommend the use of the sequence card method in elementary and middle school classes. In addition, it is also possible to monitoring the development of story-forming and writing skills among hearing-impaired children. Furthermore, the effect of sequence cards on the preschool literacy preparation skills of normally-hearing preschool children can be investigated as well.

References

- Eden, S. (2010). The effect of 3D virtual reality on sequential time perception among deaf and hard-of-hearing children. *European Journal of Special Needs Education* 23(4), 349-363.
- Fields, M. V., Groth, L. A. & Spangler, K. L. (2004). *Let's begin reading right* (5th ed.). New Jersey: Pearson Education, Inc.
- Gambrell, L. B. & Mazzoni, S. A. (1999). Emergent literacy: What research reveals about learning to read. C. Seefeldt (Ed.), *The early childhood curriculum: Current findings in theory and practice* (pp. 80-105). New York: Teachers College Press.
- Girgin, Ü. (2001). Okumaya hazırlık etkinlikleri. S. Topbaş (Ed.). *Çocukta dil ve kavram gelişimi* (ss. 223-244). Eskişehir: Anadolu Üniversitesi Yayınları.
- Ingber, S. & Eden, S. (2011). Enhancing sequential time perception and storytelling ability of deaf and hard of hearing children. *American Annals of the Deaf* 156(4), 391-401.
- Schirmer, B. R. (2000). *Language and literacy development in children who are deaf* (2nd ed.). Boston: Allyn and Bacon, Inc.
- Williams, C. L. (1999). Preschool deaf children's use of signed language during writing events. *Journal of Literacy Research*, 31(2), 183-212.
- Yıldırım, A. & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (8. baskı). Ankara: Seçkin Yayıncılık
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed). Thousand Oaks: Sage Pbc.

Evolving Pedagogy In Education: Implications To The Tauhidic Approach In Teaching And Learning

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ABSTRACT

Within the last 6 decades, there have been significant changes in educational approaches, particularly those related to pedagogy. Our basic argument in this paper is that these changes were the result of the shifting changes in the philosophical underpinnings of education. The changes can be seen from the behavioristic approach in the early 50's to the cognitive science approach in the 60's and recently, the constructivist approach in teaching and learning. In the behavioristic approach, the emphasis is on the inculcating of skills, reflected by the drill and practice methodologies. The proponents of the cognitive science began to see the importance of the thinking processes and understanding as key ingredients in the processes of teaching and learning. The shift from the behavioristic to the cognitive science is considered to be a significant paradigm shift in thinking about teaching and learning. In the early 80's the educational psychologists began to see the importance of the role of the learner in constructing his or her learning. We argue that these pedagogical changes reflect the philosophical shifts that occur in the field of education. For example, the aim of producing well-balanced individuals cannot be achieved through, for example, the "traditional" drill and practice approaches. The need to use various approaches is thus necessary in not only producing individuals who are skillful and knowledgeable, but at the same time, possess the necessary abilities needed in the twenty-first century. The skills in problem solving, communications, just to name two examples, cannot be achieved through the traditional pedagogical approaches. More comprehensive combination of other methodologies is thus needed. The educational philosophical underpinnings which are exhibited in terms of goals of education become the most important factor in determining which pedagogical approach is to be used in the specified educational system. The IKRAM-MUSLEH network of school system, for example, believes that the future citizens, coming from the school system, should comprise of those who are *tauhidic*. Tauhidic character symbolizes the god-fearing personalities. We believe that such characters will make a significant positive impact to the society, in whatever field the students choose. We will illustrate that the pedagogical practices as practiced in IKRAM-MUSLEH schools reflect its aspiration in producing the kind of citizens needed in the twenty-first century. What IKRAM-MUSLEH aspires to do is to produce future citizens who are *tauhidic* in their physical, emotional, spiritual and intellectual capacities.

INTRODUCTION

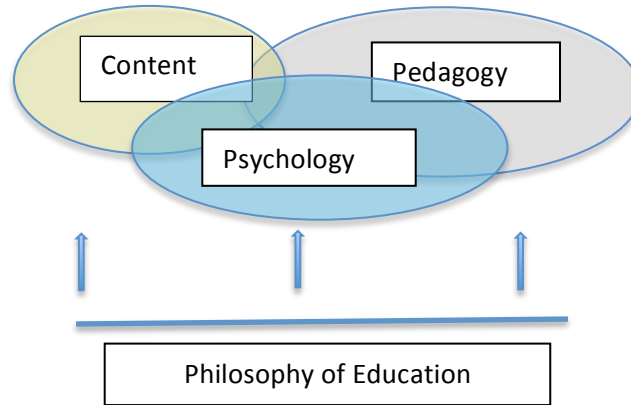
Improving the quality of teaching and learning in schools has always been a major concern of educators. In general, they emphasized that the pedagogical approaches and the curriculum used in teaching and learning must be consistent with the goals of education. Within the last 6 decades, education has experienced three significant philosophical changes, in terms of goals and objectives, parallel to the world wide developments, demands and changes in educational outlook. In the early 50's to the early 60's, education was seen as the vehicle to produce and develop human capital with skills and competencies, needed in the context of a developing country. However, in the 60's we begin to realize that skills and competencies are insufficient, and thus we need to equip our students with understanding and higher order thinking skills. This is illustrated by the implementation of the "modern curriculum" of which the modern mathematics program is a good example. Lately, we experience another significant change. We began to see the need for the integrated curriculum that will produce the holistic personalities. Balanced character is the order of the day. The changes brought about by the above are in responses to the weaknesses and insufficiencies brought about the educational philosophy on which each is based on. These three syllabi, as in any other curricular development, can be seen to have evolved from changing perspectives on the content, psychological and pedagogical considerations in teaching and learning. We will argue that the development has in many ways attempted to make learning and teaching more meaningful and thus friendlier for students both at the primary and secondary levels. We further emphasized that pedagogical changes must be in harmony with the changes in the philosophy of education.

PEDAGOGY

Pedagogy comes from the Greek word παιδαγωγέω (*paidagōgeō*); in which *παῖς* (*pais*, genitive *παιδός*, *paidos*) means "child" and *άγω* (*ágō*) means "lead"; literally translated "to lead the child". It is the science and art of education, specifically instructional theory. An instructor develops conceptual knowledge and manages the content of learning activities in pedagogical settings.

Pedagogy involves theory of teaching and learning and methodology that attempts to facilitate learning according to the relevant epistemological perspectives. Thus, the assumptions that we make about teaching and learning define the model of pedagogy that we embrace.

The structure of any curriculum development



Within the last 6 decades, in consistency with the philosophical development of education, the educational theory has shifted from the behavioristic approach of learning, to the cognitivist approach and to the present constructivist bases of teaching and learning (Noor Azlan Zanzali, 2007)

Behaviorist, cognitivist, and constructivist of learning emphasized learning as an individualist pursuit. The pedagogies of behaviorist approach emphasized “transmitting information”, reflected in such didactic approaches as drill and practice by the teacher as a way of acquiring knowledge by the student, mostly motivated by the reward and punishment techniques (Harasim, 2012).

The advent of the cognitive learning theory was in response to behaviorism theory on the direct link between “stimulus and response”. Cognitive psychologist argued that the link between stimulus and response was not straightforward or simplistic and that a number of other factors such as the mental processes of the learner can intervene or mitigate or reduce the predictability of stimulus response. The pedagogies of the cognitive approach emphasized teaching techniques that stress the thinking processes that can influence the learning output.

The constructive pedagogies focus more on the learner or group of learners (Harasim, 2012), while the other approaches (behaviorist and cognitivist) give more emphasis on the instructors, design and techniques or tools of delivery. Constructivist learning theory focuses on the role of the learner in making meaning and constructing understanding. Both Piaget and Vygotsky emphasized on the role of the learner. The constructivist view of learning has generated a number of teaching approaches, based on the following principles or values:

- 1) Active learning
- 2) Learning by doing
- 3) Scaffolded learning, and
- 4) Collaborative learning

The above principle further emphasized on the teaching methods as those emphasized in problem solving, project works etc.

The Tauhidic Approach

All the above approaches which form the basis on the evolvement of pedagogies have been used by educators. The focus on the development of the intellect of students in attaining skills and understanding has been remarkable. But what is lacking, however is the focus or the emphasis on the character development of the

students which to us is of vital importance to any form of pedagogy. Character development of students adopts the concept of the wholeness, unity and the interconnectedness of creation (Farah Ahmad, 2012). It is about engaging the students as a *whole person* – body, mind and spirit. Therefore individuals have to be developed in a holistic, integrated and tauhidic approach as shown in verses of Al-Quran and the sayings of Prophet Muhamad s.a.w. in his hadis.

The private Islamic schools that we have established is based on the philosophy that the individuals have been sent by Allah al-Mighty as *insan rabbani* (virtuous individuals) with specific *amanah* (purposes and roles). They are as follows: to be His Servants (Surah Az-Zariyat: 56), to be His Khalifah (Surah Al-Baqarah: 30) and to develop the Earth (Surah Hud: 61).

Pedagogy involves strategy, approach, methodology and techniques of how to lead the child towards the goals and aspirations as stated in the philosophy of education. Strategy manages approaches and methodologies leading towards the objectives with optimal utilization of resources. Pedagogy involves the theory of teaching and learning and the methodology that attempts to facilitate learning according to the relevant epistemological perspectives (Noor Azlan Ahmad Zanzali 2005). Plenary paper presented at the workshop of technology and Pedagogy at the Universiti Putra Malaysia

Pedagogical approach could be based on the following:-

1. Criteria for assessment of teaching process – how students are managed (e.g. individually, pairs, groups, classroom, joint classrooms).
2. How facts are delivered – inductive, deductive, departing from simple knowledge to complex, concrete to abstract.
3. Teacher or student activeness – teacher centred (e.g. lecture, demonstration), student centered (e.g. problem solving, play, group discussion).
4. Specific subjects – themes (subject on man and nature – interdiscipline and integrated; language subjects – mentalist theory: translation, grammar or behaviorist theory: communicational, situational).

Pedagogical methodology involves systematic and organized actions towards achieving a particular objective. For example storytelling, discussion, play, repetition, role play, problem solving, brainstorming, debate, quiz, acting, project, questions and socratic (Marsh. C. J., 2009)

Pedagogical technique involves specific skills for each methodology. For example story telling involves voice control, usage of instruments, skills to retain the interest of students, hand movements, face expressions, students position during story telling.

The Foundations of a Tauhidic Pedagogy

In our continuous efforts to attain excellence in the Islamic educational system, we have to take into considerations the following basic tenets:-

1. Looking into the current realities and demands of the present day society, an Islamic educational system should be realistic, produce more work done rather than mere slogans and upholding some basic principles; as follows:-
 - 1.1. All sources of knowledge and everyday living must be based on Al-Quran and As-Sunnah
 - 1.1.1. This means that Al-Quran must be the fountain of knowledge whereby one will gain guidelines on how to deal with the challenges faced in education.
 - 1.1.2. Apart from that, if one were to analyse the sunnah of Rasulullah s.a.w. and the lives of ulama' and salafus solihin, it will discover useful educational models towards establishing Islam as *ad-deenul hayah* (way of life).
 - 1.2. All efforts must be made towards developing *insan solih* (good man) who will attain *mardhotillah* (pleasure of Allah) and success in this world and the Hereafter. The development of *insan solih* must be based on:-
 - 1.2.1. Comprehensive knowledge and understanding
 - 1.2.2. Being focused in work
 - 1.2.3. Living a life based on *as-Syihadatain* (Islamic ideology)
 - 1.2.4. Good understanding of Al-Quran, Arabic Language and Science
 - 1.2.5. Being tolerant and compromising on matters of *furu'* (secondary matters) but firm on principals

- 1.2.6. Being firm on rights and truth
- 1.2.7. Acknowledgement of individual talents and potentials
- 1.2.8. The objective of man is to serve mankind
- 1.2.9. Need to practice Islamic akhlak, adab and etiquettes
- 1.2.10. Need to create a harmonious life.
2. All experts in Islamic education must be mobilized dan coordinated so that Islamic education would be continuously strengthened
3. Specific objectives and goals is a must; apart from plannings and detail explanations on academic subjects to be taught.
4. A good understanding of how an alternative to the present educational system must be developed through a clear and correct foundation of a strong civilization
5. The Islamic philosophy of education must be based on:-
 - 5.1. Syariat Islamiyah
 - 5.2. Current challenges at local and international level
 - 5.3. Comprehensive and total development of *insan soleh* – criteria of life, criteria of khalifah and requirements of khalifah Allah on Earth

The Pedagogy in IKRAM-MUSLEH Schools

As compared to the liberal educationists' view of developing personal and moral autonomy, IKRAM-MUSLEH gives particular emphasis on balanced growth of all aspects of individual's personality, including the spiritual and moral, leading to a higher level of religious understanding and commitment in all areas of life (Halstead, 2007; Muhammad 'Uthman El-Muhammady, 2005).

In the IKRAM-MUSLEH schools, learning and teaching processes are based on the unity of Allah (Aqidah at-Tauhid). The objective is to develop virtuous cadres. They are exemplary in their deeds equipped with sound knowledge, strong faith in Allah s.w.t. and imbued with high moral values, capable of managing and administering their personal life, the society, the nation and the world at large, in accordance with the principles laid down in Al-Quran and as-Sunnah. ('Uthman El-Muhammady, 2005). Consequently, balanced, integrated, holistic and continuous educational system is necessary (Halstead, M 2010). In addition, all aspects of the educational processes must emphasize the impact of the social environment and realities in which they are in. IKRAM-MUSLEH schooling system then, aims to:-

1. To mould an Islamic generation who are *muttaqin* (God-fearing) and strives to establish the *syariah islamiah* (Islamic law) in society.
2. To lay down the foundations for a new breed of experts in all fields of life. They are not only experts in a specific field but also possess positive values and attitudes.
3. To build a strong foundation in Islamic knowledge and Arabic language which would enable them to understand Al-Quran and the Hadis of Rasulullah s.a.w.

In essence, IKRAM-MUSLEH aims to develop all dimensions of a human being into an *insan rabani* (integrated personality) which will enable them to face the multitude of challenges in life successfully and thus contribute towards human progress and dignity (Sidek Baba, 2005).

Thus the pedagogy that we see as suitable in the tauhidic approach is one that holistic, integrated and Unity of Allah s.w.t. It consists elements of *dakwah* (invite), *tarbiah* (character development) and *jihad* (strive and commitment). *Zikir* (remembrance) of Allah al-Mighty and *fikir* (thinking) of His creations are fundamental. It encompasses aspects of intellectual, physical, spiritual, emotional and social (Noor Azlan Ahmad Zanzali & Mohamad Bilal Ali, 2011).

There are 7 methodologies (*wasail*) of teaching and learning as mentioned in the *manhaj tarbiah* (character development) programme, which are adopted by IKRAM-MUSLEH, namely:-(IKRAM-MUSLEH, 2013a).

1. *Liqat' usari* (study group)
It is the foundation for the development of *ukhuwah fil Islam* (brotherhood in Islam) *dakwah*, *tarbiah* and *jihad* (sacrifice). *Ukhuwah fil Islam* is a central objective in *tarbiah*. It can be nurtured via *taarof* (introduction), cheerfulness, hugs and kisses, sharing, offers to assist, "I love you *lillahi taala*" and sitting close thus enjoying the brotherhood warmth of the other person. It is done weekly for a specific period whereby elements of *taarof* (knowing), *tafahum* (understanding) and *takafol* (mutual help) is fostered. *Liqo*

usari may be implemented via group sittings, interface or online. Bonding based on love for Allah s.w.t. is strengthened. Close monitoring on current issues is also an important itinerary in *liqo' usari*.

2. *Katibah* (night prayers)
It is done monthly to develop *ruhi* (spirituality). Different venues may be selected.
3. *Rehlah* (excursions).
It is done quarterly to develop social relations. Itineraries may be varied and different locations selected.
4. *Mukhayyam* (camping).
It is done annually which focuses on physical fitness and discipline. Programmes and physical test may be changed accordingly.
5. *Daurah* (group discussion).
It is done twice annually to develop ideological understandings on Islam such as “ibadah”, “jihad”, and “politics in Islam”.
6. *Nadwah* (seminar).
It is done annually to update members on current issues and allow differences of opinions but seeking the truth based on sound arguments and facts.
7. *Muktamar* (conference).
It is done annually to update members on issues related to the organisation so as to bring the organisation to a higher level of success and capability.

Techniques must be varied and interchangeable. However, the most effective technique is *qudwah hasanah*. This refers to leadership through example.

Programmes. (IKRAM-MUSLEH, 2013a).

Preparations for programmes must include objectives, methodologies, assessment and the jobs are to be assigned to the most capable person. Implementations includes *mutabaah* (supervision), continuous support, roles, basic and continuous training given so that the person in charge comprehends fully his main task and the critical elements of the *manhaj tarbiah* (curriculum). Programmes of the organisation can be done individually or collectively. However, continuous *tarbiah zatiah* (self improvement) must be carried out by each member of the organisation. *Murabbis* must be made to be involved in social and relief activities. Assessments and reviews must be done subsequent to each programme so as to make improvements and reforms (Megat Mohammed Amin Mohd Nor 2005).

Characteristics of *Tarbiah* Process are as follows:-

1. *Rabbaniyah* (Godly).
It is about purifying the soul to enhance strong iman (faith) to Allah s.w.t., done based on the teachings of al-Quran, exemplified by *as-sunnah* (practice) of Prophet Muhammad s.a.w. and human nature. Seeking the pleasure of Allah s.w.t. is the ultimate. Love for *Akhirat* (Hereafter) must be solid. Cleansing the soul from sins must be based on the *sunnah* of Prophet Muhammad s.a.w. Ridding the person's character of *mazmumah* (negative attributes) must be continuous. Supplications, *basmalah* (in the name of Allah), *tadarus* (recitation of Al-Quran), *hafazan* (memorisation of Al-Quran), *istighfar* (seeking forgiveness), *tazkirah* (spiritual reminders), *ikhlas* (sincere), *wudhu* (ablution), *ihsan* (submissiveness), reading stories from muslim greats and congregational prayers as daily rituals are a must. Evidently, they have great influence on the mentee's affections, emotions and frame of mind which are then translated into beneficial actions and deeds to the society. The heart must be hopeful of the *rahmah* (blessing) from Allah s.w.t., fearful of His punishment s.w.t. and believe that, one day, every soul will return to Al-Mighty Allah s.w.t.
2. *Syumul* (comprehensive).
It is a complete, holistic and well balanced system which fulfils every aspect of a person's life based on *syahadatain* (the Islamic ideology). It covers aspects of cognitive, affective and psychomotor which includes knowledge, outlook, point of view, feelings, work, deeds, actions, mind, heart, limbs, quality, quantity, horizontal and vertical progress. The person which undergoes the process of *tarbiah* therefore must always be humble and never be arrogant. Existing circumstances and situations, however, is a major factor which determines the final details of programmes and activities.
3. *Tajmiah wa tazimiah* (gather and organise).
Lessons learnt from the historical occasion of *Baiatul Aqabah*, shows that new recruits must be gathered, organised, managed, assigned, inspired and disciplined. During *Baiatul Aqabah*, there were 72 men and 2 women whereby Rasulullah s.a.w. selected only 12 *naqib* (leader) from amongst them. In fact, Rasulullah

s.a.w. once said that 3 persons is enough to be considered a group and that a leader from amongst them must be elected without delay.

4. *Harakiah* (Movement)

A key forte of Rasulullah s.a.w. was his ability, by the will of Allah s.w.t., to move men into action towards reforming the society, establishing the Islamic State in seeking the pleasure of Allah s.w.t. He successfully reformed individuals into men of outstanding calibre and consequently through them, managed to change society which accepted Islam as way of life based on Al-Quranul karim wa sunnah Rasulullah s.a.w. Efforts to reform society will not work until and unless the Muslims themselves interact, intermingle and interrelate (*muayasyah*) every individual in society, inviting them to Islam, enjoining that is good, forbidding that is evil and believe in Allah s.w.t. They display abundant love and respect, get to know more on each and everyone of them, the positives and negatives and afterwards make improvements and reforms. Individually, they make visits, exchange gifts, send messages, participates in programmes, accepts invitations, make personal calls, offers financial help and tuitions, make personal notes and appointments, celebrate birthdays, confides on personal issues, giving trust and sharing common interest. Collectively, they perform *jamaah* prayers, *katibah* (night prayers), *iftar jamaei* (breaking of fast), *tadarus* (Quran recitation), *solat dhuha* (morning prayer), usrah outside homes, play sports, do *rehlah* (excursions), campings, *daurah* (seminar), physical workouts, group work, meals preparation, reunions, receptions, “kutu”, hangouts, convoys, active in fb, egroups, visits, have eating out, clean ups, half-way house, discussions, role as God father, enjoy movies, meet up parents, collecting donations, cordial with pet names, active in community service, exchange gifts, witty, personal touch, massages, haircuts and car washes.

5. Continuous (kaizen).

The process of *tarbiah* is a lifelong process which will continue until death. Inspiration and motivation unleashes potentials and sharpens the mind. *Tarbiah* can be liken to nourishment for *dakwah*. The process, therefore, must not merely be continuous but also makes the individual a better person, the next day.

Duties of a *Murabbi*

1. Planning.

All projects and programmes, no matter how small it may be, must start with a plan. This is to ensure effectiveness and efficiency. Basic elements of a plan includes SMART objectives, SWOT analysis, long term and short term plans, which consequently needs to be presented to the committee, discussed, problems resolved and decisions made. Expert opinions and wide ranging experiences are major factors to be considered. Objectives must be achieved. Benjamin Franklin once said: “If you fail to plan, you plan to fail”.

2. Deployment.

The organisation must fully utilise each and every member to ensure the successful implementation of *dakwah* and *tarbiah*. *Qudwah hasanah* is paramount and must be displayed via noble ethical values such as *adab* (ethics), gentle words, suitable expressions, humbleness, patience, open heartedness, systematic, seeking the truth, clear message, respectful and “we or us” attitude as opposed to “you” attitude.

3. Passing down the management of *tarbiah*.

Tarbiah is the only process which can instill the characteristics of IKRAM-MUSLEH teacher, effectively and efficiently. *Tarbiah* was passed down to us by Prophet Muhammad s.a.w. which starts with accepting the *syahadatain*. Al-Quranul karim and Sunnah Rasulullah s.a.w. had provided guidelines on how Islam is to be practised as individual, organisation, society and nation. Circumstances, customs, traditions, rituals and experiences, however, need to be taken into consideration before any Islamic law and jurisprudence, organisational procedures and processes are enforced.

4. Solving problems.

Problems are common phenomena in life and have to be addressed timely. It has to be identified through observations, symptoms and interactions. Reasons for problems need to be ascertained so as to determine and prioritise solutions. Finally, a decision has to be made, usually by consensus, so that the decision can be successfully implemented.

5. Assessment.

It must be done periodically, at all levels and issues resolved before they become epidemic, even though the assessment is not likeable by mentees. This is crucial so that problems can be resolved before due time and continuous improvements can be made.

Instilling Intense Enthusiasm Towards *Tarbiah*.

To achieve this, mentees must be made aware of their weaknesses and duties as muslims. They need to take examples from great muslims past and present and take serious attention to the current appalling situation of the *ummah* (muslim nations). Islam cannot possibly be practised as a way of life until and unless the *ummah* plays a leadership role. Capabilities, abilities, specialisations and skills need to be developed amongst the muslims in the *ummah*.

The *Tarbiah* Process of Instilling Values Amongst Students (Graph 1)

All students and teachers are expected to undergo the “*tarbiah* process”. In IKRAM-MUSLEH, this “*tarbiah* process” is crucial. Students are given “*tarbiah*” so that they would progress periodically through levels 1 to 5 as indicated below:

Level 1

Student is made aware of the constructs to be assessed

Level 2

Student acquires knowledge and comprehension about each construct

Level 3

Student practises, habitualises and internalises the construct selected

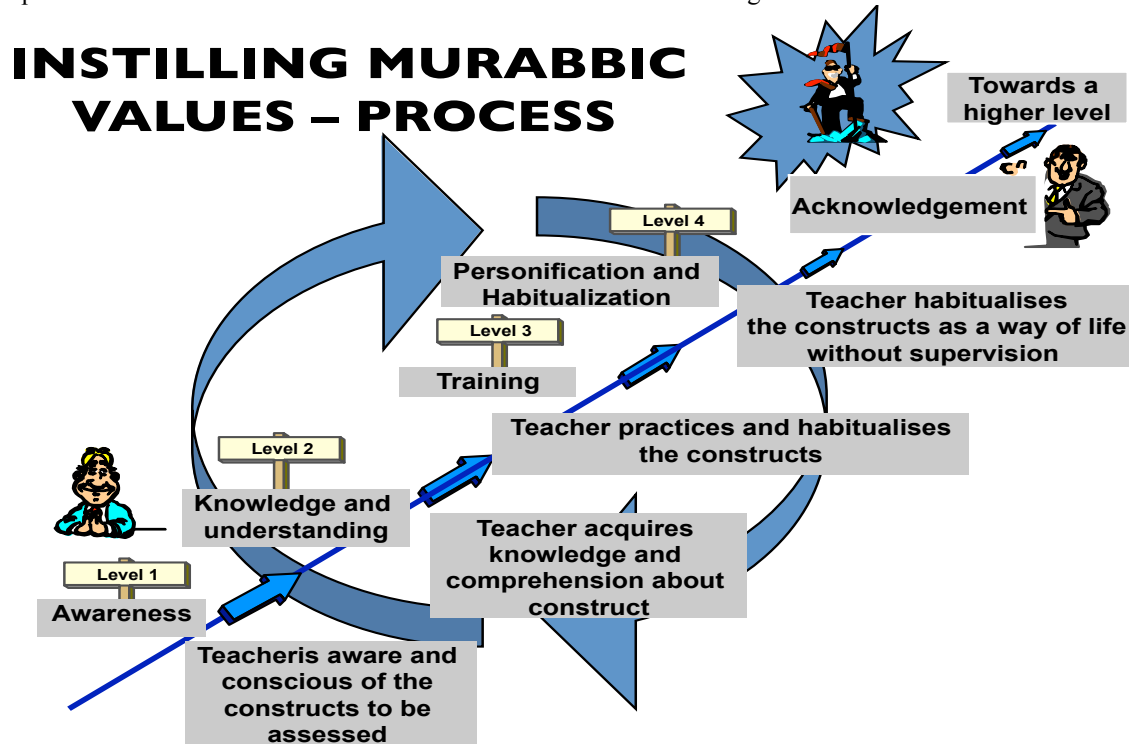
Level 4

Student habitualises and internalises the constructs as a way of life without supervision

Level 5

Accomplishments are acknowledged, recognised and encouraged for further personal development.

Graph 1 describes the levels that all students and teachers need to undergo.



IKRAM-MUSLEH have achieved several successes, as follows:-

1. Teachers

More than 20% of teachers in IKRAM-MUSLEH schools have achieved the minimum level of 03 (highest level is 05) of the *manhaj tarbiah*. They possess the murabbic values and often participated actively in *tarbiah* programmes in schools, and also *dakwah* and community service.

2. Schooling environment, culture and values

It is evident that the teachers in IKRAM-MUSLEH schools strives to uphold Islamic ethics and disciplines, implement programs based on *sunnatullah* and seek the blessings from Allah s.w.t. Noble values are being given top priority: *sidq* (truthful), *amanah* (trust), *tabligh* (convey) and *fatwah* (wisdom). There is a loving and joyful atmosphere in IKRAM-MUSLEH schools via rewards and punishments, an atmosphere of thankfulness to Allah s.w.t., much supplications, many supererogatory deeds (like fasting and prayers), purification of the soul and much remembrance of Allah s.w.t.

3. Students

Public examination results confirm the fact that the performance of students in IKRAM-MUSLEH schools are amongst the best in the district, state and even at national level. Performance of students in co-curricular activities demonstrate that their skills and attitude are at par or even better than the top students in the country as well as at the international level.

4. School image

IKRAM-MUSLEH schools are highly rated, given strong community support and registration of new students have always been oversubscribed. Parents have also shown their support to IKRAM-MUSLEH schools by sending all their children studying there. IKRAM-MUSLEH schools have been referred to as "Showcase Private Islamic Schools" by the Ministry of Education (MOE) and consulted for their experience and expertise. The MOE have recognised the contributions of IKRAM-MUSLEH schools in a number of aspects; namely:-

- 4.1. Academic performance in public examinations.
- 4.2. Annual IUM Students Debating Championship (English, Arabic, Malay).
- 4.3. Annual Musleh International Students Debating Championship (English, Arabic, Malay) – finalist from IKRAM-MUSLEH schools.
- 4.4. International programmes participated by Kelab Remaja Sekolah Musleh (KRS Musleh).
- 4.5. Community service programmes (Kembara Dakwah) organised by KRS Musleh in remote villages in Sabah, Sarawak and indigenous communities in peninsula Malaysia.
- 4.6. Islamic Studies, curriculum and teacher training modules specifically designed and implemented
- 4.7. Teaching of arabic language starts from year one primary up to year five secondary school.
- 4.8. Affordable school fees.
- 4.9. In the year 2013, 5 IKRAM-MUSLEH schools have been awarded grade 5 (excellent) for SKIPS by State Education Department. 1 school has been awarded grade 4.
- 4.10. Almost zero disciplinary issues occurred amongst students and teachers in IKRAM-MUSLEH schools.

Despite the fact that most IKRAM-MUSLEH schools lack quality facilities as compared to the mainstream schools, our achievements were on par, in fact, better than to even the premier schools in all fields such as the academic, co curricular and community programs.

Prospects of Pedagogy in Islamic Education

1. Teaching and learning have their specific objectives. They include objectives which are cognitive, affective and psychomotor. Advances in technology have made the teaching and learning processes more effective and efficient. Students learn better at minimum costs, in a more comfortable and safer environment continuously almost anywhere.
2. On the other hand, teaching and learning can also become more stressful and intimidating, especially to the teacher. Children as young as 2 years old have begun to familiarize themselves with information and communication technology gadgets. By the time they reach schooling age, they would have acquired skills that would make them accessible to the latest information and news.
3. In Islamic education therefore, pedagogy would have to adopt pedagogical approach involving students to be managed individually and in groups; inductively and deductively; from simple to complex; concrete to abstract; teacher centered; student centered; interdisciplinary and integrated; communicational and situational. Pedagogical methodology would be more user interactive. For example story telling, discussion, repetition, problem solving, brainstorming and quiz. Pedagogical technique would be more multimedia and appealing. For example story telling may make more use of motivating tools

CONCLUSION

In general, educators have emphasized that the modern pedagogical approaches must be based on the recent development in the theories of teaching and learning. Thus, we see the constructivist approaches such as cooperative learning, group work, project and higher thinking skills approaches are often accentuated in teaching and learning situations. What has been clearly indicated by most educators, however, is that the behaviorist approaches marked by the drill and practice pedagogy does not support the aims and objectives of learning based on the constructivist approaches. We at the IKRAM-MUSLEH schools, have often wondered as to whether these modern approaches are parallel or reflect to the educational ways of the Rasulullah s.a.w. Based on our experience we are of the opinion that the modern pedagogical approaches support the goals as envisaged by the Islamic philosophy of education.

References

- A. Ralim et al (2010). **Bekalan di Perjalanan. Risalah IKRAM Edisi Pelancaran.** Pertubuhan Ikram Malaysia. Shah Alam.
- Ab Aziz Mohd Zin (2012). **Strategi Dakwah Dalam Sirah Nabi S.A.W.** Jabatan Dakwah dan Pembangunan Insan. Akademi Pengajian Islam. Universiti Malaya. Kuala Lumpur.
- Alfie Kohn (2010). **Inilah Sekolah Idaman Pelajar: Siri Pembangunan Profesion Perguruan.** Instituti Terjemahan Negara Malaysia Bhd & Instituti Aminudin Baki. Kuala Lumpur.
- Azrin Ab Majid (2011). **Pendidikan Islam Malaysia: Membangun Gagasan Baru.** Jawatankuasa Tetap Pendidikan, Pendidikan Tinggi Dan Pembangunan Modul Insan, Kerajaan Negeri Selangor Darul Ehsan. Shah Alam.

- Basri Ibrahim Al-Hasani Al-Azhari (2011). **Metod Fatwa Al-Qardawi Dalam Menangani Isu-Isu Semasa**. Al-Hidayah Publication. Batu Caves.
- Farah Ahmad (2012) Tarbiyah for Shahsiah (educating for identity): Seeking out culturally coherent pedagogy for Muslim Children in Britain. In **Compare: A journal of Comparative and International Education**. Vol. 42 no 5 pp 725-749
- Halstead J.M (2007) Islamic Values, A Distinctive Frame work for moral education. *Journal of Moral Education* 36, no 3, 283-296.
- Halstead, M (2010) **An Islamic Concept of Education**. *Comparative Education* 40:4, 517-529
- Hammam Said (2013). **Asas-asas Berdakwah ke Jalan Allah**. JK Tarbiah Pertubuhan Ikram Malaysia. Cheras.
- Harasim, L. (2010). **Learning Theory and Online Technologies**. Routledge, New York.
- Ismail Lotfi Patani (2015). **Al-Muallim Al-Rabani: Teras Ummah Wahidah**. Fatoni University. Patani.
- Kamaruzzaman Bustamam-Ahmad & Patrick Jory (2011). **Islamic Studies And Islamic Education**. Yayasan Ilmuwan. Kuala Lumpur.
- Mahyuddin Ashaari (2012). **Penyayang Dalam Pendidikan**. Yayasan Takmir Pendidikan. Kajang.
- Marsh. C. J (2009) **Key concepts for understanding Curriculum**. Routledge London
- Megat Mohammed Amin Mohd Nor (2005) **Sistem pentaksiran Musleh: Taklimat kepada Lembaga Peperiksaan Kementerian Pelajaran**: Briefing to the Ministry of Education, Malaysia
- Merle J. Schwartz (2008). **Effective Character Education: A Guidebook for Future Educators**. McGraw-Hill Higher Education. New York.
- Muhammad ‘Uthman El-Muhammady (2005). **Menghadapi Cabaran Pendidikan Masa Kini** Plenary paper presented at the Simposium Kebangsaan Pendidikan Islam. Universiti Islam Antarabangsa Malaysia.
- Muhammad Mahmud Hijazi (2015). **Tafsir Al-Wadih Juz 30**. Pustaka Salam Sdn Bhd. Kuala Lumpur.
- Muhammad Lili Nur Aulia (2008). **Syarah Do’a Rabithah**. Info Islam Publishing. Jakarta.
- Noor Azlan Ahmad Zanzali (2007) **The continuing issues in mathematics assessment: The Malaysian Experience**. Plenary paper presented at the International Conference on the Mathematics Education. North Carolina. Unoted States of America.
- Noor Azlan Ahmad Zanzali (2005) **The Pedagogical Development in Mathematics Education**. Plenary paper presented at the workshop of technology and Pedagogy at the Universiti Putra Malaysia
- Noor Azlan Ahmad Zanzali & Mohamad Bilal Ali (2011). **Assessment from an Islamic Perspective**. Paper presented at the International Seminar on Islamic Education. Universiti Brunei Darussalam.
- Omar Yaakob (2015). **Mutiara Ramadhan**. Risalah Harmoni Sdn Bhd. Kuala Lumpur.
- Osman Bakar (2006). **Clasification of Knowledge in Islam: A Study in Islamic Philosophy of Science**. International Institute of Islamic Thought and Civilization (ISTAC). Kuala Lumpur.
- Rodrigue Fontaine and Khaliq Ahmad (2013). **Strategic Management From An Islamic Perspective: Text and Cases**. John Wiley & Sons. Singapore.
- Rosnani Hashim (2004). **Educational Dualism in Malaysia: Implications for Theory and Practice**. The Other Press Pte. Kuala Lumpur.
- Shaikh Abdul Mabud (2011). **Muslim Education Quarterly. Autumn/Winter Issue. Volume 24. Numbers 3 & 4. 2011**. The Islamic Academy. Cambridge.
- Sidek Baba (2005) **Pendidikan Islam dan Cabaran Perubahan**. Plenary paper presented at the Simposium Kebangsaan Pendidikan Islam. Universiti Islam Antarabangsa Malaysia.
- Yusuf Al-Qaradhawi (2005). **Tarbiyah Hasan Al-Banna Dalam Jamaah Al-Ikhwan Al-Muslimun**. Robbani Press. Jakarta.

Exists A Group Of Digital Natives At Secondary Schools In The Czech Republic?

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ABSTRACT

The article describes a research focused on the influence of the information and communication technology (ICT) on the pupils' learning. The investigation deals with the influences that distinguish between the group of pupils influenced by ICT and the group of pupils not influenced by ICT. The group influenced by ICT should evince a different approach in number of areas (in managing of two and more activities at once, in a quick orientation and searching for information on the Internet, in an ability to quickly and effectively assess the data sources, in the assessment of attitudes and opinions of the other users of the network, in critical thinking, in the preference to work in teams, in the sharing of information and personal data via the virtual social networking, in insisting on the immediate reaction on their every action etc.).

INTRODUCTION

As a result of the ICT involvement in everyday life, the character of learning and the needs of pupils and students are changing today, especially with members of the digital native generation (Marc Prensky, 2001). Such pupils and students are no longer passive recipients of information, and as they work with modern technologies that enable them to share information, create independent media messages and communicate virtually ceaselessly every day, they are also active in the process of gaining knowledge and skills.

The article describes the research of the influence of information and communication technology on the learning of pupils and students. The research deals with the effects which distinguish the group of pupils and students affected by ICT and the group of pupils and students not affected by ICT. The group affected by ICT should be characterised by a different approach in more areas (managing more activities at once, fast orientation and searching information on the Internet, the ability to quickly and effectively evaluate data sources, assessing the attitudes and opinions of other network users, critical thinking, preferring activity over static learning, preferring team work, sharing information and personal details in virtual social networks, requiring an immediate reaction to every one of their activities etc.). The research focuses on pupils and students of elementary and secondary schools in the Czech Republic.

WHO ARE DIGITAL NATIVES AND IMMIGRANTS?

Marc Prensky (2001) speaks of the generation of digital natives, i.e. children who were growing up under the influence of ICT and who do not have any problems with working and navigating in the virtual environment. The fact that such people were born in an era full of digital technologies, which surrounded them all the time and which they have used from an early age, means that the people think and process information in a completely different way than members of the previous generations, who grew up in an “analogous world”. These differences are much more profound than most parents and teachers realise. Digital natives expect immediate and rapid contact with both technologies and people. They are in contact with technologies all the time and prefer text messages over voice communication. According to Prensky, the conventional learning method based on textual content is no longer sufficient to the generation of digital natives, and is not motivating enough for them. Digital natives are people who were growing up in an environment rich in modern technologies, such as computers, digital music players, video cameras, web cameras, mobile phones etc., from early childhood. The main difference between the generations lies in different ways of thinking and processing information. Digital natives are used to obtaining information very fast, prefer parallel activities and multi-tasking, prefer graphic depiction over text, prefer play over “serious” work, and favour network cooperation and random access to information (hypertext). They expect immediate praise and frequent appreciation of their work. They see computers, mobile phones, the Internet etc. as integral parts of their lives rather than modern digital technologies.

On the other hand, the so-called digital immigrants belong in the generation of users who were not growing up using digital technologies, only acquired ICT skills in their adulthood, and do not see ICT as a natural phenomenon and part of their day-to-day activities affecting their learning strategies and ways of thinking and obtaining information. This generation is still experiencing certain doubts concerning technologies, the people do not actively use such technologies unless forced to do so by circumstances, and the way in which they obtain information and think consists in traditional models, such as linear reading. The people prefer textual information over multimedia, prefer traditional ways of communication, use the Internet only as a secondary

source of information (the primary source being printed documents), study instructions on how to use programs instead of using programs intuitively, print e-mail communication and documents, call other people to ask whether they have received their e-mail messages etc. Digital immigrants do not use the possibilities and methods of work like natives do. They do not believe that digital natives can learn anything while watching TV or listening to music because that is not what the immigrants used to do.

J. S. Brown (2000) takes up Prensky's research and establishes four basic theoretical dimensions of characteristics which define and identify the group of digital immigrants. One of the characteristics of the network generation is the ability to multi-task in an intuitive and effective manner. The other three characteristics form a complex of coherent cognitive skills.

DESCRIPTION OF THE RESEARCH

The research was focused on 8th-year elementary-school pupils and 2nd- and 3rd-year secondary-school students. The research was conducted at elementary and secondary schools in the Moravia-Silesia, Olomouc and South Moravia Regions in the Czech Republic in May 2015. We used our own questionnaire as the research method. The following methods were used to process the data: analysis of variance and correlation.

The questionnaire was mostly based on a four-grade scale, where the pupils selected the degree of agreement with various statements. The questionnaire statements were for example the following: I cannot imagine my life without the Internet, I understand graphically depicted information better than text, I listen to music while I am studying etc. Furthermore, the questionnaire tried to establish other characteristics of pupils that might affect their association with the assumed typical group of digital natives, e.g. whether they had a computer, a TV and a mobile phone at home and whether they used such technologies on a regular basis.

RESULTS OF THE RESEARCH

Overall, 370 pupils and students of elementary and secondary schools in the Czech Republic participated in the survey. 229 were elementary-school pupils and 141 were secondary-school students. 280 boys and 162 girls provided their replies. The replies proved the existence of a group of digital natives at Czech elementary schools. This group can be characterised as follows: they promote multitasking, prefer graphic depiction over text, expect immediate praise and frequent appreciation of their work, use the Internet as the primary source of information, consider modern technologies as an integral part of their lives, prefer online communication (online all the time) and are better acquainted with modern technologies not only than most older people but also than most of their peers.

Unlike elementary-school pupils, secondary-school students showed only some of the characteristics of digital natives. The groups of digital natives and digital immigrants blend together in the individual characteristics. (For more details see the charts below). Secondary-school students cannot be considered full-fledged digital natives. This may be due to the fact that the present-day secondary-school students were not growing up surrounded by modern technologies to the same extent that elementary-school pupils were.

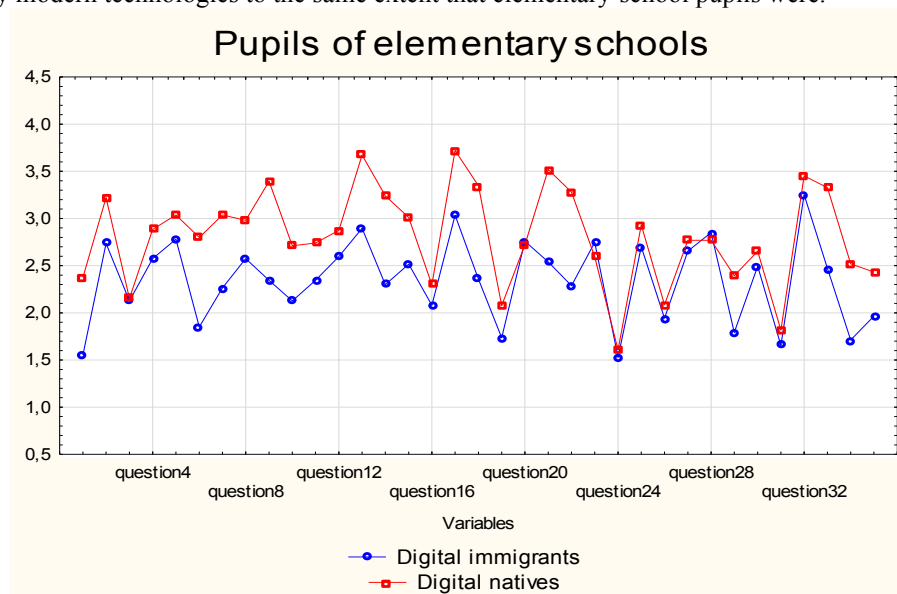


Chart 1: Division of elementary-school pupils into digital natives and digital immigrants according to their replies to the specific questions in the questionnaire.

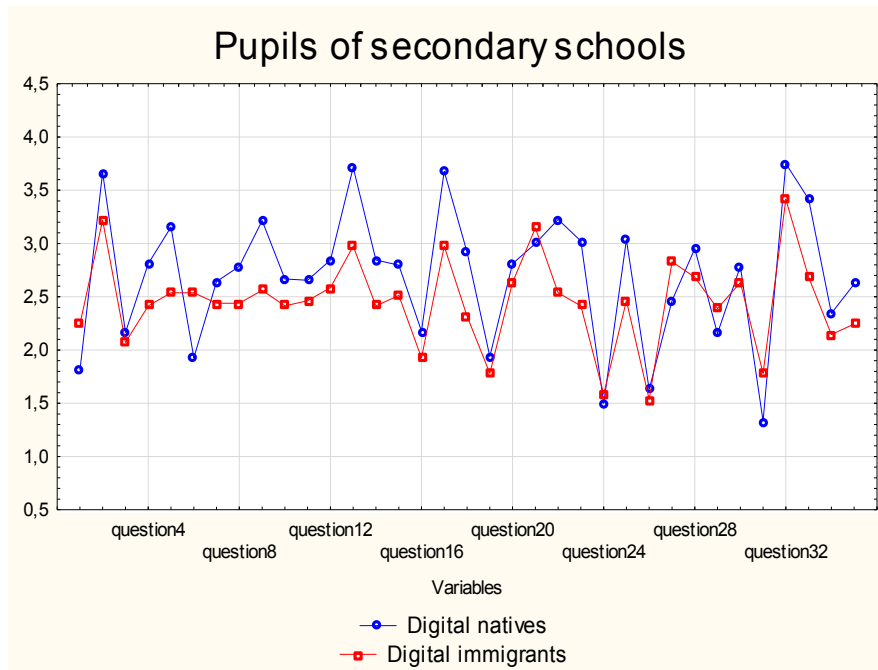


Chart 2: Division of secondary-school pupils into digital natives and digital immigrants according to their replies to the specific questions in the questionnaire.

The questionnaire also tried to establish what modern technologies elementary-school pupils and secondary-school students owned. The following chart indicates the most frequent technologies.

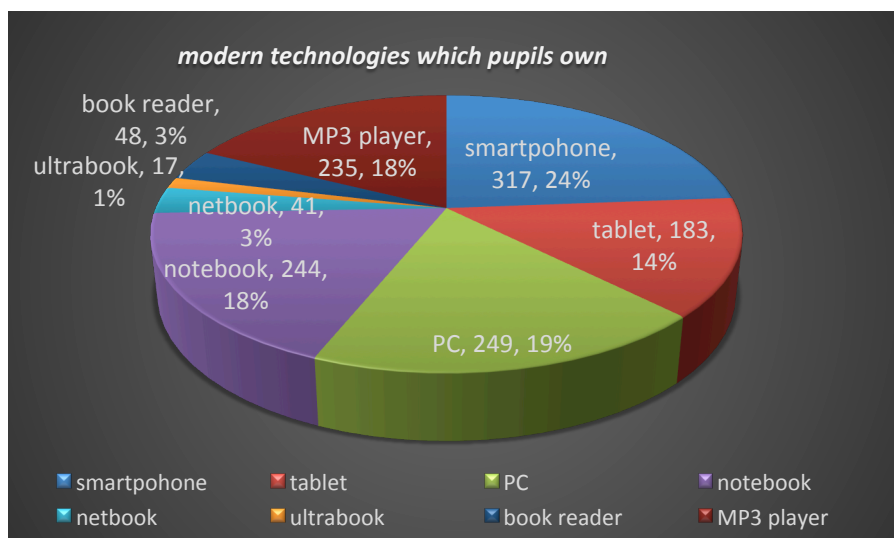


Chart 3 shows the numbers of pupils who own a particular modern technologies.

We also wanted to find out whether the pupils and students usually had access to the Internet and whether they used mobile data. 98.65 % of all the respondents said that they had access to the Internet, of which 45.68 % frequently used mobile data in their mobile phones or tablets. There was no difference between the pupils and the students or between the two sexes. The pupils and students were further asked to specify what they used their computers, tablets or mobile phones for, and how many minutes per day they were engaged in such activities. The results are presented in the following table.

Activity	Searching for information	Searching for information for school	Preparing documents for school	Social networks	Chatting with friends	E-mail communication	Watching movies and TV series	Listening to music	Working with pictures	Downloading movies and music	Playing games
Average no. of minutes per day	33	20	28	84	152	6	101	165	21	51	109

Table of activities of pupils and students using modern technologies; indicates the average number of minutes per day.

The survey has helped us to establish what kinds of modern technologies are owned by elementary-school pupils and secondary-school students. The major ones include smartphones, MP3 players, laptops, computers and tablets. Generally, the pupils and students use such modern technologies to chat with friends, listen to music and play games. In this respect, no differences were found between elementary-school pupils and secondary-school students or between boys and girls.

CONCLUSION

The research has demonstrated the existence of a group of digital natives at elementary schools in the Czech Republic, even though the group does not include all pupils. Digital natives at elementary schools may be characterised as follows: they promote multitasking, prefer graphic depiction over text, expect immediate praise and frequent appreciation of their work, use the Internet as the primary source of information, consider modern technologies as an integral part of their lives, prefer online communication (online all the time), and are better acquainted with modern technologies not only than most older people but also than most of their peers. The research has also revealed an initially unexpected characteristic, i.e. that members of this group are not very particular about computer security (the use of antivirus software, firewall etc.) and download applications also from unauthenticated sources on the Internet. The following characteristics of this generation have not been proven true: digital literacy, i.e. fast orientation and search for information on the Internet, the ability to quickly and effectively evaluate data sources, the assessment of the attitudes and opinions of other network users, the preference of activity over static learning, the preference of team work, the sharing of information and personal details in virtual social networks, and the preference of games over serious work.

The existence of a group of digital natives has been proven in the case of secondary-school students as well, even though the results are not as clear-cut as at elementary schools. The group's characteristics are fewer than those demonstrated in the case of elementary-school pupils. Secondary-school students cannot be considered full-fledged digital natives.

References

- Brown, J. S. (2000). Growing Up Digital: How the Web Changes Work, Education, and the Ways People Learn. *USDLA Journal* [online], Vol. 16, No. 2. Dostupný z WWW: http://www.johnseelybrown.com/Growing_up_digital.pdf. ISSN 1537-5080.
- Prensky, M. (2001 II). Digital Natives, Digital Immigrants, Part II: Do They Really Think Differently? *On the Horizon* [online]. Vol. 9, No. 6. Dostupný z WWW: <http://www.marcprensky.com/writing/Prensky%20%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part2.pdf>.
- Prensky, M. (2001 I). Digital Natives, Digital Immigrants. *On the horizon* [online]. Vol. 9, no. 5, ISSN 1074-8121. Dostupné z: <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>.
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From The Perspective Of Preservice Teachers, The Accomplishment Levels Of Primary School Teachers' Effective Teacher Attitudes In Science Lessons

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ABSTRACT

The aim of this study is to determine to what extent the Primary School Teachers can accomplish the effective teacher attitudes in science lessons. In this context, the observations of 83 primary school preservice teachers, who studied teaching practice course, have been used. In order to determine the accomplishment levels of primary school teachers' effective teacher attitudes in science lessons, the preservice teachers have been asked to observe the primary school teachers in the schools they attend for the practice lessons and the accomplishment levels of science education teacher's effective teacher attitudes has been determined via an observation form including 25 questions in total. Descriptive- survey research has been used in the study and the data have been analyzed through frequency and percentage. When the findings of the study have been evaluated in terms of the preservice teachers' observations, it has been concluded that the teachers prepare the setting for the active participation of all the students in the lesson and they are tolerant for the mistakes the students make during the learning process. However, it has also been concluded that the teachers do not state the objectives of the lesson clearly and definitely, they do not take the interest levels of the students into consideration and they do not spare enough time for the students to think about the answers after they ask the questions.

Key Words: Primary School Teachers, science lesson, effective teacher attitudes

INTRODUCTION

The concept of effective teacher is defined in different ways by many researchers. Stronge (2002) defined "effective teachers as individuals who have professional preparation and qualifications, background, professional attitude, dedication and reflective practice, classroom management, planning, and teaching skills, and who monitor student progress, organize instruction" (p. 25). Tatar (2004) say that "An effective teacher is good at organization, uses time effectively, helps students to overcome their problems, gives more importance on reward, and his/her decisions are very appropriate." Similar to Tatar's (2004) definition, Murphy, Delli and Edwards's (2004) study revealed that "effective teachers are caring, patient, not boring, polite, and organized". Another definition Stronge (2004) made is that "effective teachers know their students and how to communicate with them, both individually and collectively" (As cited in Tilfarlioglu and Akil, 2012, p. 117).

We can conclude from definitions stated above that there is not a certain definition for "effective teacher" or "teacher's effectiveness". Scherer (2003) claims that "no one can produce a complete and definitive list of the characteristics of great classroom teaching" (As cited in Tilfarlioglu and Akil, 2012, p. 118). We can say that it is a combination of features like communication skills, classroom management, leadership, and so on... In this study, 4 dimensions of effective teacher attitudes have been handled and analyzed. These are communication, the efficiency of asking questions, the participation of students in the lesson and educational activities.

Attitudes for the Communication Dimension

Effective teachers, let their students feel themselves special and important. They respect their students as individuals and they are also concerned with their personal lives. Having positive relations with the teacher increases the students' bond with the teachers and it promotes their social and academic development. (Furer and Skinner, 2003).

Students want to trust their teachers. Thus, the effective teachers are defined as honest and trustworthy by their students. It is impossible to get a qualified education unless there is a communication which is based on the trust between the teacher and students. (Kucukahmet et al., 2002).

The emotional support students get from their teachers has a significant role on the development of their academic and social skills. Teachers provide emotional support by setting positive relations with their students. The positive relations which are formed at the early ages between the teacher and the students increase the students' success and minimize the unintended attitudes of students. Contrarily, the negative relations, which are formed at the early ages, between teacher and student block the academic success and give the students the ground for displaying unintended behaviors. (Silver et al, 2004). Then, we can say that the effective teachers are the ones who can develop positive relations with their students.

The Attitudes for the Efficiency of Asking Questions Dimension

The teachers ask questions in order to develop the students' understanding and to prepare them for the following learnings. Some researches show that it is one of the most effective strategies developing the student's success (William, 2007 cited in Shroeder et al, 2010). The questions motivate thinking and thinking is a part of the learning. According to Stronge and others (2008) when compared with the effective teachers, the less effective teachers ask less cognitive questions. The students' own questions also develop their thinking skills. The effective teachers educate their students to make them ask good questions so as to develop their thinking and learning skills. (Cuccio-Schippirave Steiner, 2000) However, the researches demonstrate that the teachers have a tendency to suppress the class discussions. (Criag, 2005).

Sönmez (2003) states that the teachers should ask questions to the whole class and if the question is at the level of the students, s/he should count to five silently and if the number of students in the classroom is few (10 people) , each student should answer and if it is a lot, at least five different students should be allowed to answer the question. Besides, Sönmez emphasizes that teachers should bring the correctness of the answers up for discussion, should reinforce the ones who give the right answer, should keep the ones who give the wrong answers in their minds and that the right answer to the question should not be given by the teachers and the students must be allowed to find the answers through the clues. After asking the questions to the students, the teachers' waiting for some time is also related with the technique of asking questions. If the teacher waits for some time after asking the question and allows the students to think and answer the question and also gives functional feedback later on; then, effective results can be obtained. Allowing students to think after asking question not only increases the level of the answers, it also motivates them to ask questions, as well. (Walsh veSattes, 2005).

The Attitudes for the Participation of Students in the Lesson Dimension

Since the participation into the lesson is associated with academic success, it is important for the teachers to pave the way for learning so as to increase the participation of students. (Akey, 2006; Guthrie at al, 2004; Park, 2005). The activities in which students interact with their classmates increase students' participation. (Akey, 2006). The teacher's behaviors also affect the student's participation. Marzano (2007) indicates that the support of the teachers increases the student's interest, and as a result, it has an effect increasing the participation. Thus, the teachers, who want to increase the student's success, should do activities and practices which keep up the student's participation.

Associating learning with the real-life experiences is one of the most powerful teaching styles of teachers for providing the student's progress. (Wenglinsky, 2004). Such a teaching allows the students to relate their previous knowledge with what they have just learned. This relation helps them to make a connection between their real-life experiences and the concepts that might be confusing or abstract for them. It is also very helpful for the students to share their own experiences and to express themselves. (Marzano, 2007). This way, while the students are relating the lesson content with themselves, the teachers can be closely acquainted with their students.

The Attitudes for the Educational Activities Dimension

Teaching is a complicated task, so the teachers are to decide on how to teach the basic data and the skills that would be helpful for their students to gain new input and skills (Okut, 2009). Hubbard (2001) states that there are four important requirements to be fulfilled, the first of which is the qualified teaching. The second one is that the tools to be used during the teaching process must be at the level of the students. The third requirement is to motivate students to work on the tasks. And the last one is to give enough time to the students for learning the content of the presented program. The effective teachers plan, practice and evaluate teaching in a productive learning atmosphere (Kuran, 2007).

METHOD

The aim of this study is to determine to what extent the science teachers can accomplish the effective teacher attitudes in Science Lessons. This study will draw attention to the effective teacher attitudes expected to be hold by the teachers.

The working group of this study is consist of 83 Primary School Teachers, the data collection group includes 83 preservice teachers studying at Pamukkale University Education Faculty.

The method of the study is the "descriptive-survey research". Descriptive research is used to describe characteristics of a population or phenomenon being studied. It does not answer questions about how/when/why the characteristics occurred. Rather it addresses the "what" question (what are the characteristics of the population or situation being studied?) (Shields, Patricia and Rangarjan, 2013).

The observation form developed by Korkmaz (2009) for the Primary School Teachers and adapted for the science teachers by Bayraktar and Cinar (2010) has been used in this study.. In the observation form, there are degrees of frequency such as 'Never', 'Hardly Ever', 'Sometimes', 'Usually' and 'Always' so that the attitudes of teachers during the lesson could be graded. The reliability index of the scale has been found as 0.89.

The scale has been prepared in five point likert scale consisting of 25 items in total including 23 positive and 2 negative items. The scales have been distributed to the senior year students of Primary School Teacher department. In the context of "School Practice" lesson, 83 preservice teachers evaluated 83 Primary School Teachers through the observations they made during science lessons. The data have been assessed with statistical packaged software by using descriptive statistics (frequency-percentage).

FINDINGS

The observation findings of the senior year class preservice teachers on the Primary School Teachers have been assessed and have been presented by tabulation in terms of the extent of the questionnaire. In Table 1, the data regarding the communication dimension of the questionnaire are in terms of the frequency and percentage.

Table 1. Attitudes for the Communication Dimension

	Never f (%)	Hardly Ever f (%)	Sometimes f (%)	Usually f (%)	Always f (%)
1. During their communication, the teachers call their students with their names	8 (9,6)	13 (15,7)	5 (6)	13 (15,7)	44 (53)
2. Teachers discourage their students (e.g. kidding, mocking, insulting)	37 (44,6)	17 (20,5)	3 (3,6)	9 (10,8)	17(20,5)
3. Teachers call their students with negative adjectives	52 (62,7)	8 (9,6)	10 (12)	5 (6)	8 (9,6)
5. Teachers listen to what their students say carefully	10 (12)	4 (4,9)	53 (63,9)	7 (8,4)	9 (10,8)
7. Teachers are tolerant for the mistakes students make during the learning process	8 (9,6)	7 (8,4)	26 (31,3)	6 (7,2)	36 (43,4)
9. Teachers prepare setting for students to gain leadership and communication skills	21 (25,3)	7 (8,4)	32 (38,5)	13 (15,7)	10 (12)
14. Teachers have high expectations from their students	15 (18,1)	2 (2,4)	27 (32,5)	30 (36,1)	9 (10,8)
15. Teachers have a tendency to see the positive sides of students in their studies and behaviors	8 (9,6)	24 (28,9)	21 (25,3)	15 (18,1)	15 (18,1)

According to most of the preservice teachers (%68.7); the teachers usually or always call their students with their names and most of the teachers hardly ever (% 20,5) or never (% 44,6) discourage their students. Besides, the observations of preservice teachers show that teachers hardly ever (% 9,6) or never (% 62,7) call their students with negative adjectives. Most of the preservice teachers (% 63,9) state that teachers sometimes listen to what their students say carefully

% 50,6 of preservice teachers have observed that teachers usually or always tolerate the mistakes students make. Most of the preservice teachers' observations (% 46,9) indicate that teachers usually or always have high expectations from their students. However, % 38,5 of preservice teachers' observations show that teachers sometimes prepare setting for students to gain leadership and communication skills. The observations of preservice teachers also indicate that the teachers hardly ever (% 28,9) have a tendency to see the positive sides of students in their studies and behaviors or they never (% 9,6) have a tendency to do so.

In Table 2, the data regarding the dimension of ensuring the participation of the students are in terms of the frequency and percentage.

Table 2.. The Attitudes for the Participation of Students in the Lesson

	Never f (%)	Hardly Ever f (%)	Sometimes f (%)	Usually f (%)	Always f (%)
4. Teachers prepare the setting for the active participation of all the students in the classroom	12 (14,5)	5 (6)	18 (21,7)	11 (13,3)	37 (44,6)
6. Teachers enable their students to evaluate themselves on comprehending the lesson	25 (30,1)	8 (9,6)	37 (44,6)	6 (7,2)	7 (8,4)
8. Teachers make heterogeneous groups for the activities requiring collaboration in the classroom.	17 (20,5)	14 (16,9)	41 (49,4)	7 (8,4)	4 (4,9)
10. While motivating their students, teachers bring the prize into forefront	19 (22,9)	24 (29)	10 (12)	14 (16,9)	16 (19,3)
11. Teachers allow the groups to evaluate themselves in the group tasks	19 (22,9)	23 (27,7)	13 (15,7)	19 (22,9)	9 (10,8)
12. Teachers do not spare enough time for the students who have difficulty in understanding the lesson	21 (25,3)	18 (21,7)	19 (22,9)	12 (14,5)	13 (15,7)
13. Teachers give proper support for the students who have difficulty in understanding the lesson	7 (8,4)	14 (16,9)	17 (20,5)	25 (30,1)	20 (24,1)

Most of the preservice teachers (% 57,9) remark that teachers usually or always provide the setting for the active participation of all the students in the class. Some of the preservice teachers (% 44,6) say that teachers sometimes enable their students to evaluate themselves. % 39,7 of preservice teachers state that teachers either hardly ever or never give this opportunity. Similarly, there is not a satisfactory frequency for the self - assessment of the group.

According to the most of the preservice teachers (% 45,6), teachers hardly ever or never give a chance to the group for a self-assessment. The observations of most of the preservice teachers (% 49,4) show that teachers sometimes make heterogeneous groups for the occasions that require collaboration. According to most of the preservice teachers (% 51,9) teachers hardly ever bring the prize into forefront while motivating their students or they never apply it in their classes. The observations of most of the preservice teachers (% 47) indicate that teachers never or hardly ever spare enough time for the students who have difficulty in understanding the lesson. In the same way, most of the preservice teachers (%54,2) state that teachers usually or always give the necessary support for the students who have difficulty in understanding the lesson

In Table 3, the data regarding the dimension of educational activity are in terms of frequency and percentage.

Table 3. The Attitudes for the Dimension of the Educational Activities

	Never f (%)	Hardly Ever f (%)	Sometimes f (%)	Usually f (%)	Always f (%)
16. Teachers state the objectives of the lesson clearly and definitely,	42 (50,6)	7 (8,4)	12 (14,5)	12 (14,5)	10 (12)
17. Teachers ask warm-up questions at the beginning of the lesson	8 (9,6)	5 (6)	22 (26,5)	31 (37,3)	17 (20,5)
18. During the lesson, teachers take the levels of students' interest into consideration	35 (42,2)	17 (20,5)	6 (7,2)	18 (21,7)	7 (8,4)
19. Teachers attract the students' attention by using different strategies.	10 (12)	16 (19,3)	31 (37,3)	17 (20,5)	9 (10,8)
20. Teachers associate warm-up activities with the content of the lesson.	13 (15,7)	12 (14,5)	14 (16,9)	27 (32,5)	17 (20,5)
25. Teachers consider the individual differences in the class.	15 (18,1)	8 (9,6)	17 (20,5)	19 (22,9)	24 (28,9)

As it is also possible to see in Table 3, the observations of most of the preservice teachers (% 59) indicate that teachers hardly ever or never state the objectives of the lesson clearly and definitely. According to most of the preservice teachers' (% 57,8) observations, teachers usually or always ask warm-up questions at the beginning of the lesson. However, most of the preservice teachers say that (% 62,7) teachers hardly ever or never take the levels of students' interest into consideration. According to (% 37,3) of preservice teachers, teachers hardly ever use different strategies. The number of preservice teachers who state that teachers usually or always consider the individual differences is very high (% 51,8). Also most of the preservice teachers (% 53) conclude that warm-up activities are usually or always associated with the content of the lesson.

In Table 4, the data regarding the dimension of efficiency of asking questions are in terms of frequency and percentage.

Table 4. The Attitudes for the Dimension of the Efficiency of Asking Questions

	Never f (%)	Hardly Ever f (%)	Sometimes f (%)	Usually f (%)	Always f (%)
21. Teachers ask students open-ended questions	7 (8,4)	32 (38,6)	10 (12)	24 (28,9)	10 (12)
22. After asking the questions to the students, teachers spare enough time for students to think about the question	19 (22,9)	25 (30)	11 (13,3)	13 (15,7)	15 (18,1)
23. Teachers motivate students to give different answers to the questions they ask	21 (25,3)	15 (18,1)	21 (25,3)	10 (12)	16 (19,3)
24. Teachers clarify the answers they get from the students and re-explain them accurately and completely	5 (6)	24 (28,9)	3 (3,6)	39 (47)	12 (14,5)

It is clear in Table 4 that according to most of the preservice teachers' (% 47) observations, teachers never or hardly ever ask students open-ended questions. According to most of them (% 52,9), after asking the questions to the students, teachers hardly ever spare enough time for students to think about the question or they never do so. Most of the preservice teachers (% 33,4) state that teachers hardly ever or never motivate students to think about the different answers for the questions. Most of the preservice teachers have also observed that teachers usually or always clarify and explain the answers.

CONCLUSION

According to the findings of this study, the Primary School Teachers have been found to accomplish some of the efficient teacher attitudes, however, some attitudes' frequency is rather low. The data of this research represent the preservice teachers' observations and it is limited to the 83 preservice primary school teachers who took part in the study and the teachers they observed. When the findings of the study are evaluated in terms of the most of the preservice teachers' observation findings, it has been ascertained that teachers prepare the setting for the participation of students, they do not discourage the students and do not call their students with negative adjectives, they behave tolerantly to the mistakes the students make during the learning process and they provide

the proper support for the students who have difficulty in comprehending the lesson. Besides, it has been concluded that the teachers ask warm-up questions at the beginning of the lesson, associate the warm-up activities with the content of the lesson and clarify the answers they get from the students and re-explain them accurately and completely. However, the study also shows that teachers do not state the objectives of the lesson clearly and definitely, do not care about the levels of students' interest, do not give chance to the group for self-assessment and do not spare enough time for the students who have difficulty in understanding the lesson. Another conclusion is that teachers do not ask open-ended questions, and do not give enough time or encourage the students to think and give different answers.

When the literature is reviewed, one can find the studies about the accomplishment levels of teachers' effective teacher attitudes. Arslan (2014) has concluded that from the preservice teachers' point of view, Turkish teachers are not efficient in enabling the students to evaluate themselves about comprehending the lesson, making heterogeneous groups for the tasks that require collaboration of students in the classroom, bringing the prize into forefront while motivating the students, providing the proper support for the students who have difficulty in comprehending the lesson. In Bayraktarand, Cınar's (2010) study, Science Teachers have not been found efficient in self-assessment, making group work, using prize for motivating students and providing the proper support for the students having difficulty in learning.

References

- Akey, T. M. (2006). School context, student attitudes and behavior, and academic achievement: An exploratory analysis. New York, NY: MDRC
- Arslan, N. (2014). TürkçeÖğretmenlerininEtkiliÖğretmenDavranışlarınıGerçekleştirmeDüzeyleri. KastamonuEğitimDergisi, 22(1), 291-304.
- Bayraktar, Ş veÇınar, D. (2010). ÖğretmenAdaylarınınGözüile Fen veTeknolojiÖğretmenlerininEtkiliÖğretmenDavranışlarınıGerçekleştirmeDüzeyleri. Ahi EvranÜniversitesiEğitimFakültesiDergisi, 11(3), 131-152.
- Brown, Zephia A. (2004). The Attributes of Effective Teachers in a For- Profit Institution. Unpublished Doctoral Dissertation. The University of Memphis. ProQuest Information and Learning Company. UMI Number: 3137781.
- Cuccio-Schippira, S.& Steiner, E., H. (2000). Enhancement and analysis of science question level for middle school students. Journal of Research in Science Teaching. 37, 210-234.
- Criag, J. (2005). Assessing the relationship between questioning and understanding to improve learning and thinking (QUILT) and student achievement in mathematics: A pilot study. Charleston, WV: Appalachia Educational laboratory at Edvantia, Inc.
- Carrie F. & Skinner, E., (2003). Sense of relatedness as a factor in children's academic engagement and performance. Journal of Educational Psychology. 95(1), 148-162.
- Guthrie, J. T., Wigfield, A., Barbosa, P., Perencevich, K. C., Taboada, A., Davis, M. H., et al. (2004). Increasing reading comprehension and engagementthrough Concept-Oriented Reading Instruction. Journal of Educational Psychology, 96 , 403–423.
- Hubbard, Daphne W. (2001). Student Perceptions of Effective Teaching: What Students Want From Their Teachers. Unpublished Doctoral Dissertation. The University of Alabama. ProQuest Information and Learning Company. UMI Number: 3027356.
- Kuran, K. (2007). SınıftaÖğrenme-ÖğretmeSürecininYönetimi. SınıfYönetimi. (Edi. Mehmet ŞişmanandSelahattinTuran). 5. Edi.. Ankara: Pegem A Yayıncılık.
- Küçükahmet, L., et al., (2002). SınıfYönetimi. (3. Edi.).Ankara: Nobel YayınDağıtım.
- Marzano, R. J. (2007). The art and science of teaching: Comprehensive framework for effective instruction. Alexandria, VA: Association for Supervision and Curriculum Development.
- Okut, L. (2009). İlköğretimOkuluÖğretmenlerininEğitimeİlişkinİnançlarınaGöreEtkiliÖğretmenÖzellikveDavranışlarınaSahipOlmaBecerileri. Ankara ÜniversitesiEğitimBilimleriEnstitüsü, Unpublished Doctoral Dissertation, Ankara.
- Park, S. (2005). Student engagement and classroom variables in improving mathematics achievement. Asia Pacific Educational Review. 6(1), 87-97.
- Silver Rebecca B., Jeffrey R. Measelle, Jeffrey A. & Marilyn J. Essex (2004). Trajectories of classroom externalizing behavior: Contributions of child characteristics, family characteristics and the teacher-child relationship during school transition. Journal of School Psychology. 43, 39-60.
- Shields, P. &Rangarjan, N. (2013). A Playbook for Research Methods: Integrating Conceptual Frameworks and Project Management.. Stillwater, OK: New Forums Press.
- Sönmez, V. (2003). Program geliştirmedeöğretmen el kitabı. Ankara. Anı Yayıncılık.
- Stronge, J. H. (2004). Handbook for Qualities of Effective Teachers. Alexandria, VA, USA: Association for Supervision & Curriculum Development, pp. 9- 18. <http://site.ebrary.com>.

- Stronge, J. H., Ward, T. J., Tucker, P. D. & Hindman, L. (2008). What is the relationship between teacher quality and student achievement? An exploratory study. *Journal of Personnel Evaluation in Education*, 20, 165-184.
- Sünbül, A. M. (2003). *Öğretmenlik Mesleğine Giriş* (3. Edi.). Ankara: Pegem A Yayıncılık.
- Şişman, M. (2003). *Öğretmenliğe Giriş* (6. Edi.). Ankara: Pegem A Yayıncılık.
- Tilfarlioglu, F. and Akil, E., (2012). Effective Teachers' Behaviour in ELT from Students' Perspectives. *Electronic Journal of Social Sciences*. 11(41), 116-130.
- Walsh, J. A. & Elizabeth D. S. (2005). *Quality questioning: research-based practice to engage every learner*. Thousand Oaks, CA: Corwin Pres.
- Wenglinsky, H. (2004). The link between instructional practice and racial gap in middle schools. *Research in Middle Level Education online*. 28(1), 1-13.
- Williams, R. E. (2010). Administrator and teacher perceptions of the qualities of effective teachers. Degree doctor of philosophy. College of William and Mary in Virginia.

Gender And Media Literacy

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ABSTRACT

The position of the women in the social life has been one of the primary issues on which the academia makes discussions and studies especially since the 1970s. These studies which we can call gender studies are about how the women are positioned within both their daily life and different social practices, and whether they are exposed to negative practices due to their sex. In the gender studies, media analyses have a significant place. Gendered tendencies of the representations in the media and the factors affecting these representations have the leading significance for the women studies. Media literacy has an important role in the analyses of the media representations as it can indicate the difference between the reality and the fiction and raise the awareness of the individuals during the reception process. When the media literacy programs are reviewed from a gendered point of view and assume a cautionary attitude towards the gendered discourses, they will make a great contribution to the establishment of healthier media.

INTRODUCTION

Gender studies make an analysis of whether the power relations within the social life turn into an accepted inequality. Media is seen as the most important centre which affects the attitudes and behaviours of the people today. Directed by the power elites, media offer people the behaviour models, and affect their attitudes and action trends by transmitting the dominant ideologies. Affected by the stereotypes in the social life as well as affecting the social practices, media is the leading area in which the gender problems arise intensely. Especially when it is considered within the context of the influence of the mass media instruments, the sexist attitude of the media evidently affects many social practices. Accordingly, the reason why the media is seen in the centre of the gender studies today is clear. The presentation of the women in the centreline of specific stereotypes and dominant ideologies - when they are represented in the media- is highly important as this both determines the broadcasting policy of the media and helps some values settle within the society. Within this study, the relation between gender and media will be analysed, and a discussion on how the media literacy as an education program in essence may contribute to the reception of the secondary representation of the women.

GENDER STUDIES

The position of the women in the social life has been one of the primary issues on which the academia makes discussions and studies especially since the 1970s. These studies which we can call gender studies are about how the women are positioned within both their daily life and different social practices, and whether they are exposed to negative practices due to their sex. Gender studies make an analysis of whether the power relations within the social life turn into an accepted inequality. According to Serpil Sancar (2009: 176), “the gender concept points to the social meanings and contexts of the unequal relationships between the sexes, and rejects the perception of sex as only a biological feature”. Similarly, Anthony Giddens states that gender doesn’t underline the physical features differentiating between the women and men, but the features of women and men established by the society (2000: 621).

Three important progresses have been made in the gender studies carried out since 1970s: First one emphasized on the gender differences (woman-man). The researchers of this progress had the consensus that these differences derived from the biological features of the individuals. Second one focused on the learnt sex roles and socialisation. Gender was conceived as a product of specific social regulation (which didn’t degrade the woman into an individual). And the last one indicated that gender has a central role in all the (limited and patriarchal) social systems. This means that gender has been analysed within many areas like paid-work, family, politics, daily life, economic development, law and education (Ecevit, 2011:4).

GENDER AND MEDIA

One of the areas in which the gender studies are carried out is media. Especially the positioning and presentation of the women in media have become one of the primary issues on which the academics of the women studies focus. According to these studies pointing at the sexism in the media, “the ‘ideal’ audience is accepted as the men by the media, and the woman image is offered in order to flatter their pride (Berger, 1995: 64)”. While presenting the women in the media, the priorities of the men are looked for, and the women are defined sometimes as a presentation object, a sexual object or as social identities (wife, girlfriend, young girl, etc.) in line with the male-dominant patterns. Women identities created within the media are determined by the male-dominant discourses. The positioning and presentations of the women as either a worker in the background of

the media or a media “object” have been one of the primary issues on which the gender studies focus since 1970s up to now.

In the studies carried out since 1970s, it is understood that the different representation styles of the women in the media have been intensely discussed. This may be triggered by the fact that feminism gathered speed. For instance, in a study by Dominick and Rauch on American TV commercials in the early years of the 1970s, it was stated that the women were represented initially as house-wives, and they were characterised with the occupations which were described as “womanly occupations” like secretary, hostess and models. Furthermore, Butler and Paisley formulated a scale for sexism in 1980 about the women representation in the media as a holistic evaluation of the content analyses carried out within the areas like radio, television, daily newspapers, periodicals and the cinema. They specified five groups regarding the women representations based on this scale;

1. Women depicted as quintessential dumb blondes, sex objects, or victims
2. Women who are mothers, wives, secretaries, teachers, and nurses or who fill other traditionally feminine occupations
3. Women shown as wives and mothers, but are also portrayed as professionals
4. Women equal with the men (though these representations are rare and portrayed as single women)
5. Women are not portrayed based simply on their sex, but are shown as individuals, with common representations including what Butler and Paisley call role reversal and the unusual role (Tanrıöver, 2007: 155)."

According to a survey carried out in 76 countries in 2005 within the scope of the Global Media Monitoring Project run by World Association for Christian Communication (WACC) every five years since 1995, only 21 % of the news subjects in the media were female while 79% were male (Alankuş, 2012: 39).

In Turkey, in a study by Mine Gencil Bek and Mutlu Binark in 2000, it was found out that there are three different representation categories in Turkish media which are “woman as mother and wife”, “woman as sexual object” and “woman as object of violence”; and that these different woman types on the common basis of femininity were analysed under the title of “advices to the women”. According to this study, the representation style of the women in the TV programmes started to change slowly, and women were portrayed with the roles other than their traditional roles. However, their successes in their business life were shown as “extraordinary”, “supernatural” examples, and they were portrayed as “super-women”. While on the one hand, they are characterised with the qualities like authoritative, swift, meticulous, principled which are accepted to be normal for men, on the other hand, the qualities like extremely well-groomed, attractive, friendly and lovely which are accepted to be suitable for the women are attributed to the women. Successful women with a successful business life as well as being a good mother and wife are portrayed as “fully women”. In this way, the visibility of the successful women in the society is presented as almost an exception (Gencil Bek & Binark, 2000). “Survey on Women Representation Styles in the Media” run by Hülya Tanrıöver and her team in 2008 for Mediz is an important study for the media and women studies. According to this study which investigated the way in which the women are represented in the newspapers, radio, internet and television, it was found out that women are portrayed as a melodramatic factor (third-page actor), a magazine item or an instrument for “visualisation” of any news (“wall-flower”) in the mainstream media. Women are still the minority for the content processing. And they are seldom portrayed in the areas for idea production or discussion for the subjects setting the country’s agenda. On the other side, the fact that the sexist stereotypes found for example in the copyright pages of the news websites on which the women are relatively highly represented couldn’t be prevented points out that even the women working in these areas indigenise sexism in their daily routines which the occupational practices and overall discourse include.

Other studies within Turkey and abroad apart from the studies mentioned above put forth that women are rarely portrayed in the media, they are positioned after men, no equal representation is implemented, women are portrayed as a sexual pleasure and consumption object, inequality in the social structure is often ignored, and women don’t have administrative roles in the media structure, but they are employed in the lower departments. Accordingly, women representation in the media comes first in the areas on which the communication sciences focus. Especially because the gendered perspectives become widespread, interest in this area grow bigger.

One of the areas in which the sexual discrimination is mostly seen in every area of the daily life is media. When the media is examined from the gender perspective, it transmits the social, political, cultural and economic roles and values to the women and men. These representations reproduce the cultural values and expectations for womanhood and manhood and the dominant gender roles. In this context, the womanhood and manhood descriptions of the media are important for the formation, pursuance or change of the gender descriptions which are commonly shared (Kaypakoğlu, 2004: 93-94). The presentation of the women in the centreline of specific

stereotypes and dominant ideologies - when they are represented in the media- is highly important as this both determines the broadcasting policy of the media and helps some values settle within the society.

MEDIA LITERACY AS A CONCEPT

Requiring the accessibility to media messages in various contexts and styles, the ability of correct reception and perception of these messages and the ability to produce the messages on one's own at the end, media literacy is a concept which gives the masses the power to control and which enables them realise the border between the real world and the world created by the media. One of the significant functions of the media literacy in the democratic societies is that it makes possible the political participation, social justice and critical citizen. According to Joseph Turow, "being media literate involves applying critical thinking skills to the mass media, and finding meanings beneath the surface of movies, ads, and other types of content. It also involves reasoning clearly about controversies that may involve the websites students use, the mobile devices they carry, the TV shows they watch, the music they hear, the magazines they read, and much more. It means becoming a more aware and responsible citizen— parent, voter, worker—in our media-driven society (Turow, 2003:26)."

James Potter claims that media-literacy skills give the individuals more control over and more defence against the potential effects of the media. Media literacy make great contributions for acquiring skills such as "making selections among the different meanings of the media messages, checking the accuracy of the information coming from different sources, and being aware of the media's influence on the believes, attitudes, behaviours and values of the individuals and the society (Potter, 2001: 25)". Potter emphasizes that media-literacy skills offer people the opportunity to avoid from the messages which they don't need while these skills also provide resistance to the media manipulations (Potter, 2004: 10). Moreover, media literacy aims at creating effective and critical media users who will demand the diversification of the media productions. In this era in which the symbolic visual quality has become more dominant, the individuals, especially the children and youngsters need to improve their skills to decipher the symbols and codes in order for them to understand the media and its productions. The target of the media literacy is not only to enable the individuals to acquire the skills and competences in order to cognitively eliminate the negative effects of the media; it aims at preserving the life space which is determined by the media more than ever before (Alver, 2006: 23).

Some critics claim that media literacy should be perceived as a philosophical and critical way of thinking. According to Hobbs, "'media literacy' is still an umbrella concept, with a wide spectrum of different educational philosophies, theories, frameworks, practices, settings, methods, goals and outcomes (Hobbs, 2004: 134)". The prominent theoreticians like Hobbs, Potter, Buckingham and Aufderheide proposed different paths for reaching the desired results in the media literacy, which is to reach the critical audience; and they made various suggestions in order to reach effective results. While Hobbs mentions that the solution of the 7 irreconcilable issues in the media literacy (which are about whether it can protect the children, at which level the media production efficiency should be, its relationship with the popular culture, its ideological agenda, whether it can reach more students, whether economic support can be received from the media institutions, and whether it is a vehicle that can take to the result) (Hobbs, 2004) are important for shaping the future of the media literacy, Buckingham claims that one should be informed about the media sector and its productions, media categories, media technologies, media languages, media audiences and media representations, and the strategies behind for efficient media literacy (Buckingham, 1993: 132). Potter focuses on more information-gathering and perception-extension, and points at the necessity that one should have a comprehensive point of view about the effects of the media on the society, that one should know about the agreement of the creators of the media texts, that one should get to know the media industry, and that one should discover how the media executives view the audience (Potter, 1998: 261). Aufderheide lists the general principles of the media literacy and the perception level to be reached as follows;

- All media are constructions.
- The media construct reality.
- Audiences negotiate meaning in media.
- Media have commercial implications.
- Media contain ideological and value messages.
- Media have social and political implications.
- Form and content are closely related in media.
- Each medium has a unique aesthetic form. (Aufderheide, 1989: 27)

To sum up, media literacy is an effective tool which offers the cultural knowledge to the citizens in order for them to understand the features of different communication tools, the constructed world and lifestyles in the

cultural texts, the structures of the relations of the production in the media sector, and the media's role in creating the collective memory through the communication tools (Binark and Bek, 2010: 109).

GENDER AND MEDIA LITERACY

It is possible through media literacy to raise awareness of the citizens towards the sexist attitude of the media and to draw attention to, even eliminate the inequality. In fact, the media literacy program renewed in 2014 aims at “creating a society member who has a high level awareness towards the media messages through the media literacy courses; who can critically approach the cases, events and contents in the media; who can take part in the media processes with the decisions taken at the same time; who behaves responsibly and ethically; who is aware of the Human Rights and Children Rights (prevention of the exploitation and participation); who has the vision of raising a media literate individual who respects the global and local values; who has the media culture and the need for access to the media; who makes an effort to understand (analyse and evaluate) the media; who acts with the awareness of the production of the media; who can develop targets and designs for the media and the future; who has acquired skills and behaviours for media consumption and production”. Accordingly, a more elaborate program for the women representation in the media was proposed instead of a more equalitarian program.

Media literacy practices should target at enabling the individuals to become more informed about the power relations, to be respectful to the “other” and to be sensitive citizens, and should aim at transforming the alienating values and mechanisms (Binark and Gencel Bek, 2007: 209). Accordingly, viewing the media literacy from this perspective can offer an important opportunity for the gender equality to come true. For this purpose, reviewing the program from a more equalitarian perspective and purifying it from some sexist instruments can occur in different platforms.

The sub-committee, which gathered together under the Grand National Assembly of Turkey Committee on Equality of Opportunity for Women and Men in 2012, took an important step towards the equality of women and men, by offering discrimination or inequality symbols to be one of the “Smart Signs” by the Turkish Radio and Television Supreme Council. In the draft which pointed at the significance of an equalitarian and ethical media for the struggle against the women discrimination in Turkey, it is stated, “However, it is not realistic to expect that intellectual changes will happen at once, and that the media with more than one place and various backgrounds will change immediately tomorrow. But, just like the criteria of non-discrimination in terms of religion, race, sect and gender in the ethical principles adopted by all the media institutions are considerably obeyed with regard to racial, religious or sectarian discrimination, it is necessary to show the same sensitivity to eliminate the discrimination against women”. In the draft which draws attention to the significance of an accurate analysis of the media for a democratic country, it is emphasized that the materials used for the media literacy courses at schools are inefficient, and that the teachers have a high level of pedagogical inadequacy. This draft, which suggests that a critical approach be adopted for the course contents, states “On the contrary, the dominant values are reinforced. However, media literacy practices should target at enabling the individuals to become more informed about the power relations, to be respectful to the “other” and to be sensitive citizens, and should aim at transforming the alienating values and mechanisms. Accordingly, viewing the media literacy from this perspective can offer an important opportunity for the gender equality to come true”.

CONCLUSION

Media is seen as the most important centre which affects the attitudes and behaviours of the people today. Directed by the power elites, media offer people the behaviour models, and affect their attitudes and action trends by transmitting the dominant ideologies. Affected by the stereotypes in the social life as well as affecting the social practices, media is the leading area in which the gender problems arise intensely. Especially when it is considered within the context of the influence of the mass media instruments, the sexist attitude of the media evidently affects many social practices. Accordingly, the reason why the media is seen in the centre of the gender studies today is clear.

Media literacy, within the main lines, is an education program which aims at making the individuals aware of and resistant to the harmful effects of the media texts and invites the media institutions to act more carefully. As it is an education program, its target is to protect primarily the youngsters and children from the potential harmful effects of the media. Given the effects of the media especially on the children, the relationship between the media and the children is based on the assumption that the children are generally passive and open to being affected. For that reason, media literacy is a reading method, which the teachers instil the children, and which aims at minimising the harmful effects of the media.

Including the elements reinforcing the social equality into the media literacy program both enables monitoring of the media and eliminates the perception in the minds of the society which assumes that the women come second. Secondary positioning of the women and the dominance of the sexist view in both the media and the course-books can be taken to the agenda through an efficient media literacy program, and this can enable the youth to be healthier and equalitarian. For that purpose, though most of the media literacy studies focus on protecting the

individuals from the effects of the media, secondary positioning of the women in the media portraying has become an important issue which draws attention of the academics who conduct surveys in this field.

References

- Alankuş, S. (2008) “Önsöz”, Kadın Odaklı Habercilik, (Haz.) Sevdâ Alankuş, İstanbul: IPS İletişim Vakfı Yayınları
- Alver, F. (2006). Medya Yetkinliğinin Kuramsal Temelleri, KİLAD Dergisi, Sayı:7
- Aufderheide, P. (1989) Media Literacy: Resource Guide, Ontario: Ministry of Education
- Aufderheide, P. (1993). National leadership conference on media literacy. Conference report. Washington, DC: Aspen Institute.
- S.2’den aktaran Hobbs, R. (2004) ‘Medya Okuryazarlığı Hareketinde Yedi Büyük Tartışma’, Çev: Melike Türkan Bağlı, Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, Yıl: 2004, Cilt: 37
- Bek, M. G. ve Binark, M. (2000) Medyada Kadın, Ankara Üniversitesi Kadın Sorunları Araştırma ve Uygulama Merkezi, Ankara.
- Berger, J. (1995). Görme Biçimleri, Metis Yayınları, İstanbul.
- Binark, M. ve Bek, M. G. (2007) “Eleştirel Medya Okuryazarlığı” İstanbul: Kalkedon.
- Buckingham, D. (1993) Children Talking Television, The Making of Television Literacy, London & Washington: The Falmer.
- Ecevit, Y. (2003), “Toplumsal Cinsiyetle Yoksulluk İlişkisi Nasıl Kurulabilir? Bu İlişki Nasıl Çalışabilir?”, C.Ü.Tıp Fakültesi Dergisi, Cilt 25, Sayı:4
- Ecevit, Y. (2011). Toplumsal Cinsiyet Sosyolojisi, Anadolu Üniversitesi Yayınları, Eskişehir
- Giddens, A. (2000). Sosyoloji, Ayraç Yayınevi, Ankara
- Hobbs, R. (2004) ‘Medya Okuryazarlığı Hareketinde Yedi Büyük Tartışma’, Çev: Melike Türkan Bağlı, Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, Yıl: 2004, Cilt: 37
- Kaypakoglu, Serdar (2003). Toplumsal Cinsiyet ve İletişim, Naos Yayınları, İstanbul
- Potter, J.W. (2001) Media Literacy, London: Sage Publications
- Potter, J.W. (2004) Theory of Media Literacy, London: Sage Publications
- Potter, W.J (2004). Theory of Media Literacy, A Cognitive Approach, Thousand Oaks, Sage Publications.
- Sancar, S. (2009). Erkeklik: İmkânsız İktidar, Metis Yayınları, İstanbul
- Tanrıöver, H. U. (2007), “Medyada Kadınların Temsil Biçimleri ve Kadın Hakları İhlalleri”, (Haz.) Sevdâ Alankuş, Kadın Odaklı Habercilik, IPS İletişim Vakfı Yayınları, İstanbul.
- Turow, J. (2003) Media Today, Boston: Houghton Mifflin Company
- “Cinsiyet ayrımcılığına ‘akıllı işaret’ önerisi”, Cumhuriyet Gazetesi, 22 Haziran 2012

How To Improve The Effectiveness Of Training: The School-Work Alternation Projects

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ABSTRACT

The school-work alternation project is a teaching methodology of the system of education and training. It allows students to alternate periods of study and work on the basis of agreements with companies or organizations available to accommodate students.

Think of school and work as two separate realities may limit students' growth. Knowledge and know-how are two sides of the same coin. The goal is to achieve a mix of these two aspects, beyond the idea "before study and then work". Students can develop skills to better integrate into the labor market.

Work experience as the only training program is designed in collaboration with the business world. It is not, therefore, a simple operating experience, but a process that involves all players in the education of each student.

It is important to evaluate the training and professional needs of the territory, you must create the conditions to create a collaborative relationship between school and territory.

The objectives pursued are:

- reduce the school dropout rate
- raise the level of education
- promote the connection between classroom training and practical experience
- enrich the student's education with new skills, that are useful to the student in the world of work
- encourage the student orientation towards career opportunities

In this context, it is important to create networks of relationships between schools and external realities to promote job placement.

INTRODUCTION

Today companies, because of the change of the context in which they operate, require more knowledge. These latter are an important factor in global competition.

This increase in the centrality of knowledge has led to review the conditions under which people are trained. This highlights the role of training and to reflect on the role of the school in what is called "knowledge society".

The development of a country are related to work and the creation of new job opportunities. This leads us to reflect also on the value of education and vocational training, which should contribute to the development of skills needed to cope with the changes of the current work context.

In this context, some issues arise:

- early leavers from education: 12% in Europe but, for example, in Italy is 15%, in Spain is 22% in 2014 (EUROSTAT, 2014);
- high level of young people are not studying and not working (NEET rate): 12,4% in Europe but in Italy is 22% in 2009 (EUROSTAT, 2009);
- high unemployment rate 10.8% in Europe in 2013 (EUROSTAT, 2015);
- transition from school to work takes place in Italy after 25 years (the longer than other OECD countries) (OECD, 2000);
- significant is the number of young people that carry out activities inconsistent with the training received.

Questions that we can do are:

- How to enable an effective system of orientation of young people?
- Does the school adequately prepare young people to work?
- Are the laboratory experiences effective and efficient?
- Is there a combination between basic training and practical preparation?
- Can you overcome the belief that "before you study and then work"?
- Does it emerge the desire to experiment new paths in the student's education?
- How work can become an integral part of the school system?

The school-work alternation is an educational methodology to facilitate the acquisition of skills that students can use in the job market (Allen-Meares & Montgomery, 2014). It is a methodology not only centered on the subject knowledge but also on the personal skills of students. The school-work alternation is a teaching and training transverse mode that differs from the channels of the education system with the ability to "learn by doing".

It uses different tools such as classroom training, laboratory activities, internships in companies and/or public and private entities, company visits, meetings held at the school by external experts on specific issues of the world of work, with the aim of expose students to a concrete reality of work.

The work experience becomes a tool to promote the personal and professional development of the student. The heart of the experience of school-work alternation is to innovate education through teaching methods really

capable to promote a know-how conscious (Akkerman & Bakker, 2012).

Alternation allows students to complete a part of their education at a company or an institution. We can speak of an organic link with the world of work: it is a mode of flexible learning with the aim of linking classroom training with practical experience. The alternation is a combination of educational attainment and experience assisted in the workplace, designed in collaboration with the corporate world. In fact, this methodology allows students to carry out a training through alternating periods of study and work, under the responsibility of the school or educational institution (Illeris, 2011).

The school-work alternation is an educational moment, played in the corporate context, where the student checks, integrates, expands the knowledge learned at school; it becomes aware of itself and its professional orientation, strengthens the motivation to study; it can learn about the economic and productive context in what will fit. We can talk about a possible answer to the question of personalized learning for students; help young people to be leaders of their career choices, through experiences in which test their aptitudes and to respond to their aspirations.

The school-work alternation is made on the educational choices of the school, the professional needs of local companies, the personal learning needs of students (UNIONCAMERE, 2006).

In this context, we can reflect on the one hand the importance of training for the job and on the other hand, the role of job for the training.

The school becomes more open to the territory and the companies (Bramanti & Odifreddi, 2003). It can play a formative role to young people in a context where the participation and collaboration of different actors is necessary for the realization of school-work alternation, such as industrial associations, chambers of trade, etc. This enriches the training of students with the acquisition of knowledge put to use in the workplace. The work experience in the company in fact permits the student to gain a realistic picture of what will its professional reality.

The student experience in the company does not qualify as an isolated activity: it is part of a training program to promote a process of personal development of the student. In contact with the concrete operational, organizational and interpersonal problems of the workplace, the student not only widens its knowledge, but acquires greater security and operational autonomy. The stage may allow the student to test the limits of its technical preparation and its social behaviors (Coleman, 1974; Smith, & Rojewski, 1993).

This is possible through agreements with companies or public and private institutions available to accommodate students for holding an internship.

We can say that targets of school-work alternation are:

- implementation of flexible learning mode can connect classroom training with practical experience
- achieve improved results in student learning
- enrich the school training with the acquisition of skills they can use in the job market
- facilitate the orientation of young people to enhance the vocation and personal interests
- connect educational and training institutions with the world of work, with active participation in the educational process
- create a link among cultural, social and economic development of the territory

At the local level, it may apply network agreements among different schools and implement framework agreements or protocols of agreement specifying the various parties involved and their intervention projects. Moreover, if we see the school and work as two distinct realities, each with its own rules and its dynamics, we can compromise the individual growth of each student. It seems important to seek synergies and break down mutual distrust. The human resource is the center for the school and the company, so they should talk and work together and understand each other. What are the reasons that lead companies to accept students in alternation?

- ability to identify, recruit possible future resources;
- play an active role to update schools on job profiles and skills required by the labor market.

Knowledge and know-how are two sides of the same coin: the possibility of alternating school and learning experiences in the workplace, it contributes to an improvement in the results of student learning. The design of routes alternation can promote the acquisition of skills in young people with the knowledge and know-how (Dewey, 1980). This combines the training of the person with the marketability of what it learns in the working realities. Thinking and doing can be considered as complementary processes, integrated and not alternative. In this way, students can develop the skills (including practices) needed to get into the labor market: theoretical knowledge are joined also the ability to do, using the company as a classroom (Smith, & Rojewski, 1993).

The school-work alternation is not a simple experience in the world of work, but it is part of a training program designed by those who are the real protagonists of the student's education. The alternation should be considered a direct teaching method to complete the training of the young, recognizing the educational value of the work (Ribolzi, 2004). Overcome the separation between classroom lessons and practical experiences, it is realized by the combination of formal and informal education and work experience in a single training program.

First of all the school has to play a guidance activities for young people to improve personal vocations, interests, modes of individual learning.

In planning the alternation project, it is also important to consider the training and professional needs of the territory: we speak of a virtuous circle of flows of skills that can contribute to the growth of all involved, a correlation between training offer with the cultural, social and economic development of the same territory. Promote the connection between education and the world of work can contribute to the economic, social and cultural development of the same territory. The school must consider the contribution of the different players in the territory to address its institutional initiatives. We must create the conditions to establish a school-community collaboration. This to support initiatives that arouse students' interest and encourage their active participation in the educational and training experience. The ability to create effective cooperation among the different actors involved is an important added value. We can talk about the creation of a network of external partners, localized in a model of diversified experience, corresponding to the variety of skills that students can develop. A fruitful dialogue is essential for the enhancement of the study and personal commitment (Coleman, 1974).

In a multicultural society and projected more and more to international relations appears also important the treatment of language skills through participation in specific short courses or work experience summer.

Any participation in trade events can highlight the opportunities in the sector and create an experience that allows students to immerse themselves in the real professional world. This allows students to compare their knowledge with the concrete problems of work.

They are realized courses of safety training in the workplace to enable an understanding of the elements of safety-related activities. They can realize business visits and / or meetings with experts to bring young people to the issues of work and professional activities of their interest with the aim of encouraging and supporting the actions of orientation (Ribolzi, 2004).

The paths of school-work alternation take place over several years, so young people can have a wider knowledge of the job market and their attitudes and skills.

THE DESIGN OF SCHOOL-WORK ALTERNATION

The planning of the training project is the most important step for the realization of a school-work alternation process, because it should integrate education with the skills can be learned and used in the world of work. From a methodological point of view it is necessary to define a single training plan.

The phase of design allows different actors involved to participate in a process that requires a strong partnership. In the first place, in this process it is important to define the objectives, resources to use, timing, responsibilities and how to check the progress, to optimize the achievement of targets during each phase of the project.

General goal is to build tools that combine the real needs of the companies with skills acquired by students through the training courses offered (Bertagna, 2003).

The student can verify the topics covered during the training in the classroom in the operational reality. It becomes part of a system of relationships with the aim of promoting the growth of the same from a human and professional point of view.

We can define more specific objectives, such as:

- carry out a project where the school is integrated into the economic fabric of its territory, through a synergistic collaboration with the corporate world;
- identify the professional profiles required by companies, in order to direct the educational attainment and developing specific issues that may be indicated by the same companies;
- promote the acquisition of skills by the student that allow it to enter in the productive fabric;
- develop more effective methods of learning;
- develop interpersonal, communication and self-assessment capacity;
- enhance the skills acquired.

The analysis of the reference context can identify professional profiles consistent with the current market trends (for example we can think of the professional profiles in the tourist industry for a hotel management school).

With regard to these professional figures, we can define an analysis of training and professional needs to join the classroom training with the practical experience, through the adoption of flexible learning mode. We can talk about of basic educational goals (language skills, computer, etc.), technical and professional goals related to the type of activity and transversal training goals related to the capacity of analysis of the problems, self-learning, relational, etc.

Then the project includes two training sessions, integrated together and involving the school, students and companies: training in the classroom by teachers and with the support of experts identified in collaboration with the companies involved (this activity is related to the topics considered consistent with the professional profiles) and a period of training in the company through an internship.

Over the agreement and the necessary documentation, the school shares with the company the training project of the student.

From the organizational point of view shows some key figures:

- the teacher responsible for the entire project, it manages the project of school-work alternation in the school, coordinating the figures of tutors and managing relationships with external figures;

- a school tutor, it is identified among the teachers of the class, preferably of vocational subjects. It assists and guides the student engaged in a process of alternation and checks the correspondence of the path to the project signed with the agreement between the school and company. Furthermore, it is called upon to:
 - perform an orientation activity to direct the student to a more consistent with their aspirations; it aims to collect useful items also compared the expectations and motivations of individual students to participate in the path of alternation;
 - prepare the agreements with the companies;
 - address management and organizational issues;
 - agreed with the students the choice of the company considered more suitable and explain to the students the main characteristics of the context in which it will be inserted;
 - define the training agreement, that is the document by which the educational institution shares the project with the student; it aims to make students aware of the learning objectives of the course and to inform the activities in the company requires responsible behavior, in compliance with the rules of hygiene, health and safety;
 - agreed with the company tutor the path of the project by defining a training plan will be subject to testing during and at the end of the same path;
 - follow the students in companies, evaluate the progress of the experience and try to resolve any problems;
 - ensure the proper completion of forms related to the Stage performed;
 - collect the feedback of the company tutor toward the student and the student himself about the whole experience;
 - check the skills acquired by students.
- a company tutor, who is the point of union between the company and the school. It also:
 - facilitates the orientation and induction into the company, explaining the operation of the host organization;
 - guides the student in the various activities, favoring its integration in company;
 - supports the student in learning, favoring an efficient integration between training outside the workplace and training within the company;
 - draws up the request forms (e.g. the attendance sheet) and evaluates the student.

During the first steps towards school-work alternation, there are specific training actions to the listed tutorial figures (Bertagna, 2003). In particular, the training courses can analyze the regulatory environment and the labor market of where it fits the methodology of school-work alternation to:

- provide information and tools to design systems and define learning objectives;
- promote a reflection on the opportunities related to the alternation, developing methods of preparation and management of concrete training;
- allow interested persons to independently develop tools for monitoring and evaluation of the actions undertaken.

Relations and contacts between two tutors are continuing for the duration of the course, integrating concretely the training path implemented in the school with the path of integration in the employment context. The synergistic action of the two tutors evaluates the path of the student and certifies the skills acquired.

The evaluation phase should be seen as a collegiate action, fundamental to check the quality of the course, to assess the knowledge, skills, attitudes acquired by students during the experience in the company.

At this stage contribute different figures (teachers, tutors, students) through different tools (assessment sheets). In particular it may be noted that:

- the company tutor must provide, with a special card, to the school, the elements to assess the student's activities and effectiveness of educational processes. it can assess the behavioral and relational skills (punctuality, responsibility, common sense, relationships with colleagues and superiors, ability to work in a team, willingness to learn, motivation, etc.) and the organizational abilities and skills (understanding the activities to be carried out, the degree of autonomy in carrying out its responsibilities, etc.) of the student;
- the student itself is called a self-assessment of their activities. This may allow it to determine whether the work experience has improved its capacities and has played an effective approach towards a possible future professional activity;
- the school tutor, based on the assessments of the company tutor and the student, assesses overall path alternation and learning outcomes of the same.

In the course of school-work alternation is important to consider:

- the execution of the individual training program agreed with external tutors
- the degree of possession of relational and cognitive skills acquired (based on the objectives defined in the training program)
- the repercussions on the class for experiences in the workplace
- the self-assessment of the student.

In particular, the evaluation of the skills acquired is a necessary condition of the entire project of alternation, because it makes visible the results of the activities carried out by students.

We can speak of valuation techniques that allow us an assessment of the process and the result. The attention to process enables us to evaluate the organizational efficiency of the various stages of the project. This fact allows us to evaluate the ability of the school to manage the different phases of the same path while maintaining adequate quality standards.

The attention to the result leads us to talk about educational effectiveness of the learning process: in this context are also important attitudes and behavior of the student, such as, for example, those related to the acquisition of an appropriate sense of initiative and availability to learning how to learn (search for information, ask questions, etc.).

We can identify quality indicators that concern the comparison between surveys on the professional needs of the area and the results achieved by schools. This contributes to the school to validate the quality of its training.

A final evaluation of the path of school-work alternative:

- a certification of skills acquired. this can be used in situations of work or study and in professional and personal development of the young; the certification of skills acquired is an important element of the methodology of alternation;
- an integral part of the learning assessment at the end of the school year, carried out by the teachers of the class council.

The analysis of several concrete experiences of school-work alternation allows us to highlight definitely different strengths but also some critical elements. Among the strengths we are: integration of school and work, an integrated planning of the training programs, effective guidance of young people and the enhancement of training needs of the students. Among the critical elements can, however, highlight, for example: the limited information on the topic, the difficulties of dialogue at times between the school system and the labor market, the limited availability of resources by the school, the lack of incentives for companies to accommodate students in internships.

CONCLUSIONS

The improvement of the strengths and the reduction of critical factors allow us a further enhancement of this methodology to support direct cooperation of educational institutions with the world of work and the professions. If it is true, that the school-work alternation is a process in which different actors are connected, then the success of this experience can be reached when all parties involved are able to collaborate and share their objectives. This in the belief that to fully realize the training needs a closer link with the work environment. Schools and companies must achieve greater integration. The school must open outwards, creating and strengthening synergies with the territory to grasp the links between school experiences and business opportunities.

References

- Akkerman, S. F., & Bakker, A. (2012). Crossing boundaries between school and work during apprenticeships. *Vocations and Learning*, 5(2), 153-173.
- Allen-Meares, P., & Montgomery, K. L. (2014). Global trends and school-based social work. *Children & Schools*, 36(2), 105-112.
- Bertagna, G. (ed.) (2003), *Alternanza scuola-lavoro: ipotesi, modelli, strumenti*. Milan: Angeli. [Italian].
- Bozzi, L., Gallotta, A., Ferretti, F. & Capone A. (2005), *Alternanza scuola-lavoro: un modello di apprendimento*. Milan: Angeli. [Italian].
- Bramanti, A. & Odifreddi, D. (eds.) (2003), *Istruzione formazione lavoro: una filiera da (ri)costruire*, Milan: Angeli. [Italian].
- Coleman, J. S. (1974). Youth: Transition to adulthood. *NASSP Bulletin*, 58(385), 4-11.
- Dewey, J. (1980). *The school and society* (Vol. 151). Carbondale, IL: SIU Press.
- EUROSTAT (2014). *Early leavers from education and training by sex*. http://ec.europa.eu/eurostat/tgm/graph.do?tab=graph&plugin=1&pcode=t2020_40&language=en&toolbox=data.
- EUROSTAT (2009). *Young people not in employment, education or training – NEET*. http://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Young_people_not_in_employment_education_or_training_-_NEET.
- EUROSTAT (2015). *Unemployment statistics*. http://ec.europa.eu/eurostat/statistics-explained/index.php/Unemployment_statistics.
- Illeris, K. (2011). Workplaces and learning. *The SAGE handbook of workplace learning*, 32-45.
- OECD (2000), *From initial education to working life: making transitions work*, Paris.
- Ribolzi, L. (2004), Il significato dell'alternanza nei percorsi formative, in *Annuali dell'istruzione*, 1: 71-751. [Italian].

- Smith, C. L., & Rojewski, J. W. (1993). School-to-Work Transition Alternatives for Educational Reform. *Youth & Society*, 25(2), 222-250.
- UNIONCAMERE (2006), *Le sperimentazioni dell'alternanza scuola-lavoro: la voce ai protagonisti*, Roma. [Italian].

Ict As An Academic Support And Computer Basic Skill At Teenagers Students

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ABSTRACT

The purpose of this document is to show the use of Information and Communication Technology (ICT) on students in middle school on the computer basic skills as academic support in the city of Veracruz, Mexico. Obviously, is important to point the proper use of these technological resources for growth and improve the student's skills. In effect, ICT contribute improvements on the quality of teaching, but only if teachers know how to take advantage of them, they should have the proper training and also should have the necessary infrastructure (Vallejo & Huertas, 2010). Consequently, it has become essential to analyze how is migration happening and evolution of the media applied as a support tool and computer science in educational activities. The subjects for study were 979 students of two secondary schools in Veracruz city. The instrument designed by the Technological Institute of Sonora (Angulo, 2012) used in order to measure the level of adapting and using of ICT on the students according to Likert spectrum. The results show a low frequency of use in the students about ICT as an academic support and for computer basic skills.

Keywords: ICT, Mexico, secondary schools, teaching-learning, online interaction, academy support.

INTRODUCTION

Nowadays, it is very important the implementation of ICT as a work tool in learning activities, however, the great impact of social networks and the consequent misuse give them a disadvantage in the potential of the attributions that they can bring when these technologies are been used as academic support. Nonetheless, it's extensive and satisfying work made by a school network in the educational context, to promote the use of ICT that provide multiple advantages within the teaching-learning process resulting in greater efficiency in teaching activities the results are significant knowledge acquisition by learners (Vela & Cituk, 2010).

Of course, computers along this technological adaptation are positioned as electronic devices very useful in making effective procedures digitally, through which you can share information in a highly structured way.

ICT as a tool for academic support

Importance of ICT as an academic resource

Students have a lot of information, however, is not equivalent to the knowledge acquired therefore ICT contribute to the advancement of student learning if teachers know how to exploit them in order to achieve improved education (Vallejo & Huertas, 2010). In the same way, Berríos and Buxarraís (2005) sustain the importance of the level of training of teachers who play an important role, also as proper advice in ICT and involve it in teaching the students. Moreover, both authors agree that applying these measures would result in an educational and social progress.

According to Hernández, Alvarado, Teherán y León (2013) in reference to ICT applied as a tool for school support, "the educational environment might not be the exception, considering their potential for more efficient handling of information, however, its application in this area has not been the desired and still a long way to go" (Tapia & Martínez, 2013). In relation to this, the students who should take advantage of opportunities it is

noteworthy that the application of ICT in educational environments can be favorably motivation of students with learning difficulties (García-Valcárcel, Basilotta & Camino López, 2014).

In the same way, Escalera and Santillán (2011) support evolution would happen if education support of ICT: "The quality of high school, entails major transformations such as redesign their educational programs to make them more flexible and student-centered; to create strategies that facilitate self-learning by exploiting the potential of information and communication technologies".

For Andión (2010), incorporation of ICT in the educational context involves a change in the pedagogical paradigm, it is necessary to pass of the model focused on teaching to other model that turn focused in knowledge acquisition. Which makes it more obvious to integrate the Internet in the training process as a new way to access to multiple information sources within the global network.

Related studies

Students as cornerstone in this context, demonstrate an unfortunate use of ICT on academic environment, looking from their perception, the majority (82.5%) considered competent in relation to the use of Internet in a study performed in Chihuahua, Mexico. While when we asked to the students about the use of mobile phone as a resource for school, they mention a lower percentage (13.38%). In contrast, most students (88.23%) perceived that ICT can provide personal influence that may manifest as learning, equally they considered this kind of tools in their future or working life (Tarango, Romo-González, Murguía-Jáquez & Ascencio, 2013).

In addition, we found an investigation of the University of Murcia (Spain) obtained similar results as the study in Mexico. Regarding the data obtained, showed that only 13% of students aged between 13 and 15 years use their computer as a working tool. Also, who doesn't have Internet service turn out to be mostly young people who use office tools in their computer (López, 2014).

Respect to the use of ICT by teachers and application to their students, a study by the Autonomous University of Tlaxcala indicates that in three schools, the majority noted that they use computer at home to check email, develop educational materials, download educational materials, make their class planning, and to participate in social networks. This means that all interviewees have minimum knowledge and skills using ICT, so it means ICT role is far to be a key teaching tool for educational purposes (Andrade, 2013).

Finally, Elvira, Torres, Echegaray and Barradas (2013) in a study in the city of Veracruz, Mexico found that students despite the lack of technological knowledge provided by their schools, they acquired knowledge through research tasks and projects that teachers asked them. Likewise, they commented that using ICT helped them to manage, find and update information easily. Moreover, the students affirmed the relevance of using the Internet as communication channel between students and teachers.

ICT in secondary schools in Mexico today

Regarding to the situation of Mexico, the government is supporting programs that may contribute counteract the technological divide and promoting adaptation to ICT applied as a school tool. Farfán Gutierrez José Enrique, director of the Technical High School 36th (benefited by this program) explain: "Teachers have internet groups, medium through which they communicate with students about homework even review them right there. Communication with Parents also is already adapting according to these technologies" (Navarro, 2014).

Regarding the situation of ICT in basic training, are located to support the activity of the teacher, a resource to promote student learning. However, a project of "Enciclomedia" was thought to steer the digitization of books and other electronic media for later use it in classrooms, the program contemplated the start in the classrooms of fifth and sixth grade and then spread to secondary level. However, regarding the financial management of such plan, Ministry of Public Education, SEP (Secretaría de Educación Pública in Spanish) proposed not to provide computers in all classrooms, instead of that just use one classroom between students groups (Canales, 2007).

Currently, the official website of the Ministry of Education in the state of Veracruz (Secretaría de Educación Veracruzana, SEV in Spanish) has informative programs and educational content dedicated to the use of ICT in the state. Which is important to mention "project network" specialized for primary and secondary (basic education) as booklet of teaching suggestions, "Galileo" focused on supporting materials online, "Brain Pop" provides animated films for children, adolescents and adults, "PISA" (oriented to docents), among others (Secretaría de Educación de Veracruz, 2015).

According to a report realized by census of schools, teachers and students in basic and special education (Censo de Escuelas, Maestros y Alumnos de Educación Básica y Especial, CEMABE in Spanish) collected information proportioned by National Institute of Statistics and Geography (INEGI, 2014) that only 20.5% of public schools have Internet access. In relation to general data (Mexico), the results of schools with access to information technology 31.1% (public educational institutions) and 56.8% have functional computer equipment.

According to Forbes, in Mexico there are one computer for every 46 students, and warns that one of the four areas that deserve attention is the speed connectivity in schools, among other points mentioned are a better web presence in municipalities, move towards a single health record (Morales, 2015).

METHODOLOGY

The study was a descriptive using a quantitative methodology. The population consisted of students from two secondary schools. In total there were 979 students, 587 from the ESTI # 1 (Industrial Technical Secondary School No. 1) and 392 of Miguel Alemán secondary (General # 5). The average age of them was 14 years, with a minimum of 11 and maximum of 16 years, of which 527 (53.8%) were female and 452 (46.2%) were males.

The instrument designed by the Technological Institute of Sonora (Angulo, 2012) used in order to measure the level of adapting and using of ICT on the students. These two dimensions comprising 19 items on a scale with five options ranging from "never" to "every day".

RESULTS

Using ICT as academic support

It is relevant to mention that at least 34.5% of students chose "never" regarding to the use of email for academic counseling with the teacher. While in the response "1 to 4 times per month", lower participation is observed to be chosen by 25.3% of respondents. In both the alternative "1 to 3 times a week" shows 28.2% of incidence. However, "every day" chosen only by 12%.

Regarding the use of ICT as academic, support on using email to discuss school topics with their classmates in respect to the variable frequency, they assert that "1-3 times a week" used by 33.3% the students. However, the response "never" reported a 26.8% of incidence. While the alternative of "1-4 times a month" is very close to the above, is demonstrated 26% participation by students. Instead, the answer "every day" earned less repetition, one remaining 13.9% by the students.

On the use of ICT as an academic support regarding the use of Chat to work with theirs teammates, the variable frequency shows most frequently in the answer "1-3 times a week" with 38.2%. Consequently, the item "1-4 times a month" expresses a level of use of 24.3%. Also, "never" was selected by 20.3% and the lower trend (17.3%) argues that uses it "every day".

About the use of ICT as an academic support regarding the use of virtual forums to work with their teammates, the variable frequency indicates that the response "never" is used to 32.3% of students. However, the "1-3 times a week," says 31.4% resort to it. However, for the response "1-4 times a month," said that 25.9% used such teamwork. That indicates us a significantly lower incidence of "everyday" which was selected by the remaining 10.4% of students.

Concerning the use of ICT as an academic support by participate in online learning communities to share learning experiences with students from other places, the variable frequency notes that the increased use by students is at the "1-3 times a week" which was noted by 35.9%.

Table 1. Use of ICT as an academic support

Item	Never	1-4 times a month	1-3 times a week	Everyday
Use of email for consulting with the teacher.	34.5	25.3	28.2	12.0
Use of email to discuss school topics with classmates.	26.8	26.0	33.3	13.9
Participate in panels of academics with Internet resources discussion.	33.2	25.5	31.4	9.9
Use of Chat to work with your teammates.	20.3	24.2	38.2	17.3
Use of online forums to work with your teammates.	32.3	25.9	31.4	10.4
Work with an email account for sending and receiving emails.	22.8	24.7	34.5	18.0
Collaborate with classmates in blogs through comments and publications.	23.5	24.2	34.7	17.6
Participate in online learning communities to share learning experiences with students from other places.	28.1	24.7	35.9	11.3

Computer basic skills

The Table 2 presented the information about computer basic skills, so for the item: use antivirus software in your computer, the frequency variable demonstrate the option “1-3 times a week” as the choice more selected with 36.9%. Nonetheless, the alternative “everyday” obtained 28.9% of preference. On the other hand, the option “1-4 times a month” point to 24.7% incidence. While the remaining 13.3% chose the option “never”.

In reference to computer basic skills about if, they can install and uninstall software in their computer, the frequency variable indicates in the answer “1-3 times a week” with 37.4% as favorite by respondents. However, 25.2% of pupils selected “1-4 times a month”. Therefore, it refers to alternatives “everyday” and “never” they obtained 21% and 16.4% respectively.

Respect to computer basic skills in the category download software using Internet, the frequency variable results indicates 24.5% for “1-4 times a month” and 34.6% for “1-3 times a week”. In return, the option “everyday”, close to previous mentioned with 24.3%. Further, the alternative “never” indicates 16.6% incidence

On the part of computer basic skills in the category use computer basic tools (calculator, calendar, etc.). The frequency variable presents a tendency to utilize “1-3 times a week” with 40%. Likewise, in the option “1-4 times a month” obtained 25.1%. However, the alternative “everyday” was confirmed by 19.8%. Therefore, the answer “never” point to 15.1% remaining.

With relation to computer basic skills in the category: I use word processor. The frequency variable marked with most assiduity “1-3 times a week” 39.8%. In the same way, “1-4 times a month” is support by 28.5% of student body. In return, the alternative “everyday” reached 16.8%. While “never” was select by 14.9% of students.

Attending the computer basic skills in the category: I use Power Point presentation software. The frequency variable shows an incidence notable respect to realize “1-3 times a week” with 39.7%. In addition, in the option “1-4 times a month” confirms 26.3% of student body. While the answer “everyday” obtained an assiduity of 20.4%. Moreover, in alternative the answers selected “never” they was preferred by 13.5% of respondents.

About of computer basic skills in the category: I use accessories to save information, the frequency variable has an orientation “1-3 times a week” with 39.3%. Afterwards, the item “1-4 times a month” with a reiteration by 24.6%. Even though, the alternative “everyday” was indicated by 21.8% of pupils. Contrastingly, the answer “never” got 14.3%.

Referent to computer basic skills in relation to category: I can make online shopping; the frequency variable emphasizes the option “never” with 38.6%. By the answers de “1-4 times a month” and “1-3 times a week” the students point to 22% and 27.4% respectively. Contrarily the alternative “everyday” manifested 12% of preference by schoolchild 12%.

In relation to dimension computer basic skills, the frequency variable was presented the maximum value in the section: I use the alphanumeric keys combination and punctuation from keyboard confirms in the alternative de

“1-3 times a week” confirms by nearly half of respondents (46.9%). While that 20.4% of pupils manifested that uses “everyday”. However, the option “never” was claimed by 17.3% of students. Finally, the alternative “1-4 times a month” was chosen by 15.4%.

Table 2. Computer basic skills

Item	Never	1-4 times a month	1-3 times a week	Everyday
Use of antivirus software in my computer	13.3%	20.9%	36.9%	28.9%
Install and uninstall software in my computer	16.4%	25.2%	37.4%	21%
Use the alphanumeric keys combination and punctuation from keyboard	17.3%	15.4%	46.9%	20.4%
Browse the Internet using links or hyperlinks that provides other internet page	16%	25.5%	38.7%	19.7%
Download software using Internet	16.6%	24.5%	34.6%	24.3%
Use of the computer basic tools	15.1%	25.1%	40%	19.8%
Use of word processor	14.9%	28.5%	39.8%	16.8%
I use of power Point presentation software	13.5%	26.4%	39.7%	20.4%
Use of accessories to save information	14.3%	24.6%	39.3%	21.8%
Make online shopping	38.6%	22%	27.4%	12%
Update computer programs using Internet	19.5%	20.2%	33%	27.3%

CONCLUSIONS

Even adoption of ICT is a reality around the world, there is a lot tasks to do in Mexico. The students have a scarce use of computer resources, so is far to be a priority in their current scholar activities. At least in the Mexican literature context there is a tendency to use ICT for social and entertainment purposes and most of the students do not use ICT to study, just to do their homework. The students consider competent in basic skills related with the use of computer and internet (information search, social networks, email, etc.). In the same way, the students consider competent with software tools (word processor, spread sheets, and so on), but they also affirmed do not use for educational purposes in a very formal way. Finally, as a conclusion is advisable to mediate the use of ICT taking into account the time spent on learning activities by students this can be achieved by an appropriate instructional design by the teacher putting emphasis on student cognition.

References

- Andión, M. (2010). Equidad tecnológica en la educación básica: Criterios y recomendaciones para la apropiación de las TIC en las escuelas públicas. *Reencuentro*, 59, 24-32. Retrieved from: <http://www.redalyc.org/pdf/340/34015675004.pdf>
- Angulo, J, Piza, R., Mortis, S.V., García, R.I., Valdés, A.A., Carlos, E.A., Torres, C.A. (2014). Competencias digitales en el uso de las Tecnologías de la Información y Comunicación en profesores de Secundaria. México: ITSON.
- Andrade, J. (2013). Creencias sobre el uso de las TIC de los docentes de educación primaria en México. *Sinética*, 4, 1-13. Retrieved from: http://www.sinetica.iteso.mx/?seccion=articulo&lang=es&id=623_creencias_sobre_el_uso_de_las_tic_de_los_docentes_de_educacion_primaria_en_mexico
- Berrios, L. & Buxarrais, M. (2005). *Las tecnológicas de la información y la comunicación (TIC) y los adolescentes. Algunos datos*. Madrid: OCTAEDROy OEI. Retrieved from: <http://www.oei.es/valores2/monografias/monografia05/reflexion05.htm>
- Canales, A. (2007). Tecnologías de la información y la comunicación en la educación. Retrieved on March 2015, the website of the Institute of Economic Research at the UNAM: <http://www.ses.unam.mx/publicaciones/articulos.php?proceso=visualiza&idart=217>
- Navés, F.A. (2015). Las TIC como recurso didáctico: ¿Competencias o posición subjetiva?. *Revista de Investigación Educativa*, 20, 238-248. Retrieved from: <http://revistas.uv.mx/index.php/cpue/article/viewFile/1308/2399>

- Cituk & Vela, D.M. (2010). México y las TIC, en la educación básica. Revista e-FORMADORES, 2, 1, 1-7. Retrieved from: http://red.ilce.edu.mx/sitios/revista/e_formadores_pri_10/articulos/dulce_cituk_feb2010.pdf
- Elvira, E.N., Torres, C.A., Echegaray, J. & Barradas, D.S. (2013). Formas de uso de las TIC en estudiantes de Escuelas Secundarias Públicas de la zona norte de la ciudad de Veracruz. Congreso Internacional de Investigación en Ciencias y Sustentabilidad. AcademiaJournals.com. Tuxpan, Veracruz. 26-28 June. 248-253. Retrieved from: http://www.researchgate.net/profile/Carlos_Arturo_Torres_Gastelu/publication/236975443_Formas_de_uso_de_las_TIC_en_estudiantes_de_Escuelas_Secundarias_Pblicas_de_la_zona_norte_de_la_ciudad_de_Veracruz/links/0deec51a9719582273000000.pdf.
- León, J.&Tapia, E. (2013). Educación con TIC para la sociedad del conocimiento. *Revista Digital Universitaria*, 14, 1, 1-12. Retrieved from: <http://www.revista.unam.mx/vol.14/num2/art16/index.html>
- Escalera, M.E. & García, A. (2011). Ambientes virtuales en el proceso enseñanza-aprendizaje. *Ide@s CONCYTEG*, 76, 6, 1236-1248. Retrieved from: http://concyteg.gob.mx/ideasConcyteg/Archivos/76_ESCALERA_Y_GARCIA.pdf
- García-Valcárcel, A., Basilotta, V. & López, C. (2014). Las TIC en el aprendizaje colaborativo en el aula de Primaria y Secundaria. *Comunicar. Revista Científica de Educomunicación*, 42, XXI, 65-74. Retrieved from: http://rabida.uhu.es/dspace/bitstream/handle/10272/7740/las_tic_en_el_aprendizaje.pdf?sequence=2
- Hernández, S.H., Alvarado, R.M., Teherán, P., León, J.C. (2013). Diseño e implementación, apoyada en Tecnologías de la Información y la Comunicación, de una unidad temática para la enseñanza de la Química Orgánica. *Revista TECKNE* 11 (1) p. 6-13. Jun. 2013. Retrieved from: http://www.researchgate.net/profile/P_Teheran_Plinio_del_Carmen_Teheran_Sermen/publication/260753245_Diseo_e_implementacin_apoyada_en_tecnologas_de_la_Informacin_y_la_comunicacin_de_una_unidad_temtica_para_la_enseanza_de_la_qumica_orgnica/links/00b7d5330deac41899000000.pdf
- Instituto Nacional de Estadística y Geografía. (2014). Censo de Escuelas, Maestros y Alumnos de Educación Básica y Especial. Retrieved from: <http://www.uv.mx/personal/kvalencia/files/2013/09/INEGI-2014-Censo-Escolar.pdf>
- López, M. (2014). TIC y redes sociales en educación secundaria: análisis sobre identidad digital y riesgos en la red. *Etica@net*, 14, 2, 162-175. Retrieved from: <http://www.grupoteis.com/revista/index.php/eticanet/article/view/43/46>
- Morales, C. (2015). *A México le urge una revolución de innovación*. Forbes. Retrieved from: <http://www.forbes.com.mx/mexico-le-urge-una-revolucion-de-innovacion/>
- Navarro, M.F. (2014, August 28). Educación digital llega a secundarias de la Ciudad de México. *Excelsior*. Retrieved from: <http://www.excelsior.com.mx/comunidad/2014/08/28/978652>
- Pantoja, A.& Huertas, A. (2010). Integración de las TIC en la asignatura de tecnología de educación secundaria. *Pixel-Bit. Revista de Medios Educación*, 37, 225-237. Retrieved from: <http://www.sav.us.es/pixelbit/pixelbit/articulos/n37/18.pdf>
- Sánchez, M., Serrano, J.L. & Prendes, M.P. (2013). Análisis comparativo de las interacciones presenciales y virtuales de los estudiantes de enseñanza secundaria obligatoria. *Educación XXI*, 1, 16, 351-374. Retrieved from: <http://www.redalyc.org/pdf/706/70625886017.pdf>
- Secretaría de Educación de Veracruz. (s.f.). *SOFTWARE Y CONTENIDOS EDUCATIVOS*. Retrieved from: http://www.sev.gob.mx/servicios/soft_educ/
- Tarango, J., Romo-González J.R., Murguía-Jáquez, L.P. & Ascencio-Baca, G. (2014). Uso y acceso a las TIC en estudiantes de escuelas secundarias públicas en la ciudad de Chihuahua, México: inclusión en la didáctica y en la alfabetización digital. *Revista Complutense de Educación*, 1, 25, 133-152. Retrieved from: <http://revistas.ucm.es/index.php/RCED/article/view/41250/41702>

In Search Of Modern Times: An Essayistic Cultural Survey

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ABSTRACT

With some slight exaggeration, perhaps, you could say that the focus of this essay is on examining the essence of the media, or media-imparted, present. In other words, it has to do primarily with applied philosophy. The aim is also to couch in appropriate verbal garb ideas related to both image of age and spirit of place, as well as their profound scrutiny. Quintessentially, the goal is to develop the analytic methodology of *Zeitgeist* and *topos*. Perhaps it could also be called a multi-layered consciousness of the present or a love of cultural wisdom – the uncompromising aim is, after all, to advance contemporary understanding.

ECHOES OF ERSTWHILE

Following Finland's bloody civil or national war, the young generation declared its common existential motto through the mouth of Matti Kurjensaari (1950, pp. 15–16): "Never again war!" This was also the first generation that had not grown up in the shadow of the slaughtering block stained with the blood of its fellows. It was Olavi Paavolainen, that relentless cultural observer, who gave a face to the entire period and to the collective vision of mankind's common brotherhood. He was opening the windows to Europe in Paris, and it was there that he wrote his inflammatory analyses of the age for the stylish *Aitta* magazine. The renowned essay "In Search of the Present" was published in the magazine's 7/1927 issue. It captured in words the prevailing and predominating spirit of the epoch: "And so I left on a journey *in search of the present*. In search of a new world and a new humanity. I fled "the thousand lakes" and exhilarating coniferous forests and rolling daisy-filled meadows to find petrol canisters, primeval wastelands of cranes and chimneys and asphalt roads. [...] I fled the beauty and poetry of the old to find the new that our own age has created, which is unique only to that which day by day becomes more triumphant and dominant. For woebegone is he who does not understand his own time and does not love it! –" (Paavolainen, 1927, pp. 20–26).

The idea of a generation's importance is relevant in this context. It also interested the Spanish philosopher José Ortega y Gasset. In his book *The Revolt of the Masses* (1952, p. 43) he explores the meaning of the height of time and being at the historic level. Each generation considers its own modernity to be the best of all presents that have ever come about. Even so, the different generations seem not to be able to benefit from the achievements of their predecessors. Although the present moment is assumed to shape the ultimate height of the times or the pinnacle of modernity, understanding of the contemporary is very often rather meagre: somehow rootless.

Perhaps Yrjö Kokko was familiar with Ortega y Gasset's deliberations when he wrote his excellent travel book *The Islands of Good Will*, which appeared in 1953. In it, he looks at the country of his birth from a distance, from the Canary Islands, and writes movingly: "Is a man's fatherland, therefore, the period in which he is born, where he has grown up and which dies with him? Perhaps the fatherland is only the soil where he was born, a homeland which, compared to the universe, is no greater than the grave where a man is stowed out of sight when he is dead. But isn't the fatherland the people who speak his language, the people with whom he has experienced shared joys and sorrows, shared destinies? But the fact is that generations pass on. New generations don't think and feel the same. Opinions change, just like circumstances. When your own generation dies, does then your own nation also die?" (Kokko, 1953, p. 317).

SNIPPETS ABOUT THE PRESENT

Is part of living in modern civilization the incessant quest to know your own present? Then it probably also has to with updating the self: the temporal commodification of the ego. In other words, familiarizing yourself with the contents of everyday life as experienced by succeeding or younger age groups would apparently make it possible to love each present correctly. In accordance with this way of thinking teachers, for example, should probably be aware of the concrete experiential elements that constitute their students' quotidian worlds. Yet the inevitable existential necessity probably holds true even in all its tediousness: the same reality presents itself to various generations as a different reality. Each generation has a special linguistic existential catchphrase which creates a strong sense of shared understanding and belonging. It also erects an existential wall that keeps others at bay. On the other hand, now we also might well be talking about a well-worn gap or ravine which has been cut into existence and cannot be bridged. The idea of being an outsider has taken on the everlasting form of worldiness.

What is the spirit or essence, then, of this actual, twenty-tens modern age? A teacher is *cool*, and shows off his coolness by being *au fait* with body piercing. But on the other hand he is irredeemably *passé*, yesterday's man, drawing his eyebrows together in a frown of condemnation. The core idea of the teacher's professional education, the transgenerational *flair* or *je ne sais quoi*, is to acquire for himself a tattoo that expresses his own uniqueness. Perhaps this hegemony of commodification and commodifying of the self also includes some esthetic or cosmetic surgery: aging is an illness that can be cured under the knife of a plastic surgeon. Then, too, the presentable, well-tended neckline, expressed by the word 'dekoltee' in Finnish, will not have been overlooked. Compare this with the word 'dekoltointi' in Finnish, which only refers to a woman's dress with an open neckline, while the French word *décolletage* means the act of cutting the neckline in a woman's dress. *Décolleté*, in turn, describes a low-cut neckline or a more revealing cleavage. Has painstaking and meticulous skin care somehow got mixed up with the garment industry, one wonders. Such suspicions are probably irrelevant anyway since updating and staying up-to-date are the key words in assessing human worth. Whether you find it all appealing or appalling only serves to reveal your out-and-out barbarism.

Ethical awareness is associated with a profound contemporary understanding. Dress is one of the most important expressions of modern humanity's physical self-image. The way people choose to be dressed demonstrates their alertness to their fellow beings. *Vintage* clothing is today's undisputed fashion choice. It lies, after all, at the very heart of *haute couture* attire. And there are places where the creations of Paris's leading fashion houses have even been called classics: unique vintage one-offs or items meant for collectors. And not a mention of recycling, flea markets or second-hand clothes. Something, of course, that has been totally unnecessary because trendiness is what really matters.

It is patently obvious that the dimensions of lived space and time include the existential positions of here (*hic*) and there (*illic*) (see e.g. Itkonen, 1999, pp. 48–50). At the same time, the concept of present has similarly acquired new meanings: one person can go unto another indirectly, mediatedly. Text messages and e-mails bring those who are close to us and almost complete strangers into the quotidian deluge. This is why, for example, a teacher in Finland has to be familiar with Microsoft Messenger, IRC galleries, Twitter, DIGG and who knows what other online material. What if someone describes himself as a digger - is he then a friendly Australian, somebody keen on making bundles of money, or merely active in his garden? Is it possible to do a kickflip while Internet surfing? Does the World Wide Web have spiders as well as bugs? And does phishing make use of a trawl rather than a net? Or would this lexical catch decked out in its new media garb then be too modest?

It seems that existential here and there positions are very closely bound up with the essential nature of the generations. Without them it is impossible to keep track and stay on the heels of present moments. The generations, however, cannot swap their existential positions with each other. This is why mutual understanding of a collective shared world may at times be problematic. Maybe this is how it has to be. Otherwise, Helvi Hämäläinen's award-winning collection of poems *Sukupolveni unta* (Dreams of My Generation) (1987) would be totally incomprehensible. Each generation sees the dreams of its own present moment, day and night. For this reason the worst attitude to take is disapproval. Our fellow beings deserve better. And a smile raises a smile in return.

CONSCIOUSNESS OF THE MODERN AGE

In 1929, Olavi Paavolainen put into words a quintessential question related to cultural research. In his classic work *In Search of the Present* (Nykyäikää etsimässä) he wrote about the relevance of understanding the essence of a time or age. The renowned essay "In Search of the Present", already mentioned earlier, thus provided the name for the book published two years later. To see into the core of the defined present is a particularly difficult task, whatever the decade: "For us, modernity has yet to be 'invented'! No individual possessing the gifts of a soothsayer or clairvoyant has risen up to look directly into the essence of the age and, using the mighty power of words, to open up its secrets to people's gaze" (Paavolainen, 1929, p. 133).

Paavolainen's deliberations come across as being close to the philosopher Henri Bergson's famous idea of vital impetus (*élan vital*). Lauri Viljanen, Paavolainen's Torchbearer comrade, analyzes this concept of creative development central to Bergsonism in his well-known work *Militant Humanism*, which first appeared in 1936. A second and more compact edition was published in 1950. It contains the following sentence which continues to fascinate: "The leverage, or *élan vital* for this development, whose creation a human being participates in as the highest, conscious stage of development, is the real core of the world, itself the divine" (Viljanen, 1950, p. 261).

Consciousness of the modern age consists of two levels: it means the task where somebody endeavours on behalf of others to interpret the spirit of an epocal present. However, it can also be assumed to mean the way in which each private individual understands his or her own present. When the subject, in accordance with the latter

element, attempts to express his or her selfness and existential style, the existential interpreter of the first element may be confused. The same world really does not appear to people of different ages as an identical and uniform world. The everyday life we experience is dominated by the law, mentioned earlier, of mutual non-interchangeability of existential positions, of here and now positions. It would be possible to characterize this state of affairs such that each of us is permanently chained to our own here-position, our hereness of existential insightfulness (for consciousness of the modern age, see especially Itkonen, 2012; 2015).

The researcher can, of course, make so bold as to try and interpret the existentiality of the present moment in the year 2015. Then, using the power of the word and the vehicle of philosophical introspection, his goal becomes that of opening up the secrets of the present to his fellow humans. We are, then, not dealing with just a very modest or straightforward goal. So what is this approaching surge of life, this vital impetus, like? What are its constituent ingredients? At this point let us allow a brief cross section to serve as leverage for creative existential development.

The whole of existence would seem to be dominated by the opposing movement of antagonistic forces: in each moment there are two powers at play struggling to move away from each other. This creates an existential tension, which sets the rhythm for everyday routineness. May the following mischievous précis of observations on contemporary life enlighten us more.

If you are feeling at a loss, there's good reason to call in a taste designer. His skills will help you lay out a beautiful table setting for life. As a pick-me-up or as a mood-booster, enjoy a couple of refreshing or perhaps even reviving shots. After all, it is very non-chic to talk about sipping or swigging – or, to use more common terms, taking a nip or a wee dram. If there happens to be a winter frost in Finland, a wise choice of footwear is morning slippers, the Aino (a woman's first name, somewhat like Mabel) brand for women or the Reino (Reginald) brand for men. Jogging shoes are also suitable, and for men they can be worn with a suit. There again, in the blazing heat of the summer, winter boots are an absolutely excellent choice. If necessary, you can ride your Jopo bike (a popular Finnish brand) and the journey will pass by imperceptibly. A shirt with sufficiently short sleeves guarantees unrestricted views of your tatooings. The midday sun will make your piercings glitter with dazzling brightness. Books are completely unnecessary; tablet computers will do everything, even serving as place mats on the dining table. It's simple to use a document camera to display the essential features of your own identity. In bygone days, this device would have been called an episcope. Leggings or long johns – what does it matter! Uncompromising elegance is what really matters. A landline phone? Get away with you! It's so handy to use your mobile phone even in the cinema and theatre. Each and everybody must be allowed to be an individual. Such is the spirit of today.

When Viljanen's work describing militant humanism and Paavolainen's culturally critical travel book, a collection of essays entitled *A Guest in the Third Reich*, appeared in 1936, people did not suspect in the exciting glow of the Berlin Olympic Games that very soon the Grim Reaper would be driving his carriage across Europe with the bells of destiny ringing out death. Perhaps it is good or absolutely necessary that by nature the interpretative sense of present is a conceptual apparatus that reminds us of Søren Kierkegaard's thinking: Life is lived forwards, but understood backwards (see especially Thielst, 1999; for Kierkegaard see also Itkonen, 2009, pp. 177–205).

A further strand of this topic is found in what Peter von Bagh says about movies that are larger than life (see, e.g., von Bagh, 2007). Earlier I thought a little cynically that only death is larger than life – it ends and defeats life. Nowadays, though, I have been developing a kind of reflective framework where an existence larger than life also means something else. It signifies that a work of art, a phenomenon or idea exceeds its own limits, its own area of being. In other words, it will survive longer than merely in the thoughts of the generation alive at the time it appeared: it becomes transtemporal and transgenerational. Yet each generation in turn will formulate its own interpretation of it.

Joy contains a wisp of sadness. And vice versa: in sadness there is a hint of joy. Can I even answer the question of who I myself might be? And who, then, are these contemporaries, those other me's, who inhabit this present with me? What are their joys and sorrows made of? I am leaving on a contemplative journey into my innermost self. Perhaps my words on existence will reach out to attain the transindividual and arouse a surge of self-examination in some other human being – even in an ideal existential companion:

If I arrived now, I'd just be a picture of several yesterdays,
in content the same me that repeats itself into infinity.
You don't want a man like this – mascu without linity,

who has life at his back.

I drag myself deep into the sand of being,
where the paths, too, are softer.
The roads proceed concentrically,
from yesterday's beginnings to tomorrow's endings.
In fluid motion.

When the rhythm of many frenzied days has scorched my lifeskin,
when this body has begun to see,
I will check my trap once more:
only then am I there and here.
As chronologically unrelated me's, in a single self,
as a newly found bundle,
which you too must open.

References

- von Bagh, P. (2007). *Sininen laulu: Itsenäisen Suomen taiteiden tarina*. [The blue song: The story of the arts in independent Finland]. Helsinki: WSOY.
- Hämäläinen, H. (1987). *Sukupolveni unta: Runoja*. [Dream of my generation: Poems]. Helsinki: WSOY.
- Itkonen, M. (1999). *Esteettinen kasvatus: Filosofisia lähtökohtia*. [Esthetic education: Philosophical starting points]. Helsinki: Kirjayhtymä.
- Itkonen, M. (2009). *Kulttuurikuvia kotomaasta: Filosofisia tutkielmia ajan ja paikan hengestä*. [Cultural pictures of the homeland: Philosophical studies on the spirit of time and place]. Jyväskylän yliopiston ylioppilaskunnan julkaisuja 80. Jyväskylä: Kampus Kustannus.
- Itkonen, M. (2012). *Aikaikkuna 1930-lukuun: Filosofisia tutkielmia suomalaisuudesta ja varkauteisuudesta*. [A time window on the 1930s: Philosophical studies on being Finnish and from Varkaus]. Jyväskylä: Jyväskylän yliopisto, opettajankoulutuslaitos.
- Itkonen, M. (2015). Minä, kameleonttikuluttaja: Tutkielma toden ja tarun rajamailta. [I, the chameleon consumer: A study at the borderlines of truth and fiction]. In Itkonen, M., Heikkinen, V. A. & Inkinen, S. (Eds.), *Kameleonttikuluttajan paluu: Aikamatkaa kotiseutua, maailmankylää ja elämystä etsimässä* (pp. 15–105). [Return of the chameleon consumer: The time traveller in search of homeland, global village and experience]. Helsinki: Haaga-Helia ammattikorkeakoulu.
- Kokko, Y. (1953). *Hyvän tahdon saaret*. [Islands of good will]. Travelogue. Helsinki: WSOY.
- Kurjensaari, M. (1950). *Hyvä ja paha Pariisi suomalaisessa valokeilassa*. [Good and bad Paris in a Finnish spotlight]. Helsinki: Tammi.
- Ortega y Gasset, J. (1930/1952). *Massojen kapina*. [Revolt of the masses]. Finnish translation by S. Kallio-Visapää. Helsinki: Otava.
- Paavolainen, O. (1927). Nykyaikaa etsimässä. [In search of the present]. *Aitta*, 7(2), 20–26.
- Paavolainen, O. (1929). *Nykyaikaa etsimässä: Esseitä ja pakinoita*. [In search of the present: Essays and anecdotes]. Helsinki: Otava.
- Paavolainen, O. (1936). *Kolmannen valtakunnan vieraana: Rapsodia*. [A guest in the Third Reich: A rhapsody]. Jyväskylä: Gummerus.
- Thielst, P. (1996/1999). *Elämä ymmärretään taaksepäin, mutta se täytyy elää eteenpäin: Kertomus Søren Kierkegaardista*. [Life is understood backwards, but it must be lived forwards: The story of Søren Kierkegaard]. Finnish translation by T. Lehtinen. Porvoo: WSOY.
- Viljanen, L. (1936/1950). *Taisteleva humanismi: Kulttuurikriittillisiä ääriä Goethestä nykypäivään*. [Militant humanism: Culturally critical outlines from Goethe until today]. Second amended edition. Hämeenlinna: Karisto.

Informal Learning In Online Social Network Environments: An Evidence From An Academic Community On Facebook

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ABSTRACT

This work aims at deepening the informal learning patterns of conference participants in Online Social Network (OSN) communities. In particular, this study considers the interactions within a Facebook community triggered in the last 40 days by academic organizers in order to nurture a favorable context around an upcoming academic conference. This paper proposes a novel methodology together with the first application of its kind to the academic event context in order to provide tools and techniques for conference hot topics prediction and professional sub-networks identification.

INTRODUCTION

Knowledge is widely recognized as one of the key resources which are currently shaping both the social and economic facets of the globalized society (Yusuf, 2009; de Castro, Rodrigues, Esteves, da Rosa Pires, 2000; Burton-James, 2001; Iammarino, 2005; Palmieri and Giglio, 2014).

Several studies (Drucker, 1992; Sawyer, 2006; Macey-Bruges, 2001; Palmieri and Giglio, 2014) prove how knowledge sharing is a trigger of the innovation process and fosters increased levels of productivity in any organizational context. By leveraging knowledge, both firms and freelance professionals are more likely to achieve better results and competitive advantages (Di Pietro and Anoruo, 2006; Takeuchi, 2006).

In light of the importance of knowledge sharing within organizations or professional communities, learning processes keep on gaining the attention of the research community (Allen and Seaman, 2007), since they represent the way through which knowledge is transferred between people. In fact, such processes are closely related to the interactions for sharing knowledge between teachers and learners, since knowledge exists only as part of the knowers and it is filtered by learners' needs and backgrounds (Fahey and Prusak, 1998; Tuomi, 1999). Therefore, knowledge is the cognitive output of an inflow of stimuli emerging within a learning process (Alavi and Leidner, 2011).

However, some (radical) changes in learning processes and related tools have occurred overtime. This lead some scholars (Twigg, 1994) to adapt the traditional definition of learning in order to take into account emerging delivery mechanisms, technologies and tools, along with highly evolved society's expectations, attendance patterns and institutional structures. Last, but not least, (Twigg, 1994) provides also a detailed analysis of how educators changed their teaching behavior, since nowadays they know more about how people learn.

Although many studies of learning were conducted so far, research on informal learning is still in its very early stage (Aramo-Immonen, Jussila and Huhtamäki, 2014). Moreover, the emergence of online communities emphasized the lack of studies in the field of informal learning within OSNs, which has been considered to an even lesser extent. The aim of this paper is thus to focus on informal learning in OSNs communities in order to fill this gap and analyze learning patterns during pre-events online communication and activities.

In particular, this work aims at predicting hot topics discussed by conference participants, which can be identified by means of Social Network Analysis (SNA) tools and techniques before the academic event. This study is also geared to identify in advance potential sub-networks of professionals, which will likely gather around specific research topics.

In Section II, authors briefly introduce some theoretical issues and definitions of informal, non-formal, formal, intentional and accidental learning. In Section III, the methodological aspects are detailed - e. g. choice of methods and algorithms, context-dependent issues, limitations of data collection and extraction. In Section IV, results and findings are presented by means of the analysis of Facebook posts, likes and comments in the conference-related community. Section V concludes by addressing possible applications of this study in other fields, future research efforts and possible limitations.

THEORY ABOUT LEARNING AND RELATED RESEARCH

Based on the increasing relevance of knowledge resources and the way they are transferred among teachers and learners, authors aim first at presenting existing theoretical definitions of informal, non-formal, formal, intentional and accidental learning.

INFORMAL LEARNING

Informal learning concerns the cognitive processes related to specific interests and activities of individuals and communities. The learning process at hand may embrace different activities - which may vary from discussions, talks and presentations to information, advice and guidance – and is generally accomplished in flexible forms and in informal settings (Jeffs and Smith, 2005).

Informal learning is unorganized and often lacks the definition of clear learning objectives in advance. It is also defined as a learning by experience since learners are continuously exposed to potential learning opportunities (OECD, 2010).

Studies of informal learning (Conner, 2005) revealed that more than 75% of learning processes in professional contexts occur in a very informal way. Moreover, it is not rare that the most valuable learning dynamics are triggered by serendipitous phenomena.

As a matter of fact, companies tend to separate their most valuable organizational learning efforts from formal training programs. Informal activities in firms are generally not well-structured and not held by schools or freelance professionals (Conner, 2005). Nonetheless, the dichotomy between informal and formal learning can not be reduced to the valuable difference existing between what people tend to learn intentionally or accidentally.

The informal vs formal dichotomy mirrors the emerging changes in the way people learn, which is not only related to traditional educational patterns. Today's learning also depends on learning needs, knowledge path of individuals (Fahey and Prusak, 1998; Tuomi, 1999), learning environments, supporting technologies and tools, and society's expectations (Alavi and Leidner, 2011; Twigg, 1994). A challenge in common in both informal and formal learning is that of developing new learning strategies at the same pace of the technological evolution of learning tools. Otherwise, learners may experience a lack of guidance on how to adapt their learning efforts to the occurring changes in today's complex world (Mosher, 2004a; Mosher, 2004b).

However, it is important to point out that informal learning may include both forms of unconscious and unintentional learning efforts, on the one hand, and of intentional and conscious learning activities taking place in non-structured educational settings, on the other hand. Therefore, it is recognized as an experience-based form of learning *latu sensu* (Fahey and Prusak, 1998; Tuomi, 1999). Yet it concerns with dreams, arts, culture, concepts and other dimensions of life, recalling the even broader theories of “life-wide learning” (also known as “andragogy”) and “adult learning” (Reischmann, 1986; Reischmann, 2004a; Reischmann, 2004b; Reischmann, 2011).

In light of this, professional and organizational learning tend to be included in such theoretical fields, together with intentional, unintentional, hidden, small scale and incidental learning (Reischmann, 1986).

Most learning efforts, especially adult learning activities, have a substantially incidental – i . e. “*en passant*” – nature, due to adults “learning in passing” (Reischmann, 1986) which play a key role in such informal dynamics.

Informal learning has a non-ordinary nature and is classified as a project-like activity. Also conference-related activities are included in such a category (Gann and Salter, 2000; Hobday, 2000). Some authors argue that a project always imply some non-routine learning processes (Davies and Brady, 2000). Nonetheless, in the field of academic conferences annually held by professional communities, the non-routine perspective is no longer sustainable, since participants tend to realize comparable studies and to re-use research methodologies on similar topics (Aramo-Immonen, Jussila and Huhtamäki, 2014). Hence, professionals generally perform research in similar directions as in the past and retrace annually the same learning patterns. On the other hand, also event organizers have an inclination to put forward again similar activities or structures (Aramo-Immonen, Jussila and Huhtamäki, 2014). In light of this, extant literature proves how studies of learning put academic conferences among project-like activities, hence including them in the informal learning sub-category (Popper and Lipshitz, 1998; Prencipe and Tell, 2001). Therefore, such a form of learning is compliant with the requirements of the research context at hand, thus making it worthy of consideration for this work.

NON-FORMAL LEARNING

The majority of authors recognizes non-formal learning as a somehow organized process which is separated from the established formal system. Moreover, it is associated with well-defined learning objectives set in advance (Conner and Clawson, 2004; Conner and Clawson, 2004; Olaniyi, 2015). Therefore, it is a more structured form of learning than the informal one. In this case, the learning output may result either from intentional efforts of individuals or as accidental outcomes of organized learning activities. It may occur apart from the existence of learning objectives and is a mid-way learning between informal and formal processes.

It has a flexible and operational nature (OECD, 2010) and is often related to adult learning with the explicit aim of developing socioeconomic and political status of individuals (Olaniyi, 2015). Hence, it is considered as a basic tool for ensuring sustainable development worldwide. Adult learning embraces a set of different learning processes whereby adults enrich their skills and knowledge background or gear them to support the development of the society (UNESCO, 1997). Life-wide educational systems should cover the whole lifespan of individuals and foster a systemic process of knowledge generation, accumulation and upgrading (Cropley, 1979). Moreover, they should ensure the achievement of self-fulfillment of individuals by combining all the educational contributions coming from informal, non-formal and formal learning (UNESCO, 1997). Hence, adult learning is composed of any educational effort organized without legal compulsion (Okedara, 1980) and apart from formal learning activities (Radcliffe and Colleta, 1989). Adult learners are endowed with a richer knowledge background, professionalism and experience, which affect learning patterns relevantly (Fahey and Prusak, 1998; Tuomi, 1999). In non-formal contexts, adults are often equated to teaching partners (Olaniyi, 2015).

Non-formal learning is one of the learning forms associated with the idea of education as a “cafeteria system” (Nyerere, 1979). Such a system should be able to serve greedy learners, irrespective of the purpose – e. g. intellectual, vocational or recreational (Olaniyi, 2015).

Ultimately, when dealing with the analysis of learning patterns among conference participants, non-formal activities prove not to be compliant with the requirements of project-based learning typical of academic events (Aramo-Immonen, Jussila and Huhtamäki, 2014; Popper and Lipshitz, 1998; Prencipe and Tell, 2001) and should not be taken into account for the empirical study proposed in this paper.

FORMAL LEARNING

Formal learning is the most structured process among those analyzed in this paper and it is geared to provide learners with new skills, competences and knowledge (OECD, 2010). It has an intentional nature and then, learning objectives are always set in advance. The learning environment is generally composed of a hierarchical structure whereby school-like programs are organized and delivered, starting from the primary school to the higher education and professional training courses (Conner, 2005).

It includes the organization of meetings, classes and e-learning activities in formal settings and event organizers and teachers are responsible for planning, steering and control of learning (Learning Guide, 2004).

It is important to point out how formal, informal and non-formal learning are mutually exclusive. Yet they are often combined within broader mixed-learning programs (Learning Guide, 2004). According to some studies about learning programs geared to employees in multinational companies in Norway and also in the U.S. - e. g. Boeing, Motorola, Ford and Siemens -, formal learning is often associated with informal activities (EDC, 1998; Skule and Reichborn, 2002). In particular, each hour of formal activity is associated with four hours of informal learning, thus proving the “80/20 rule” developed in (Raybould, 1995; Dobbs, 2000; Lloyd, 2000; Vader, 1998) and the “70/20/10 formula” proposed in (Eichinger and Lombardo, 2010).

Formal learning is also associated with the so-called “spending-outcome paradox” (Cross, 2003a). Companies invest most learning budgets in formal learning, despite it has the least impacts in terms of organizational learning (Cross, 2003b).

Other studies show how only a quarter of the total amount of skills and knowledge required to perform ordinary job tasks is acquired under formal learning activities (Grebrow, 2002), while the rest comes from informal learning (Coomey and Stephenson, 2001; CapitalWorks, 2000).

Formal learning has not been taken into consideration for the empirical study of this paper due to the unorganized learning process occurring in academic conferences and the lack of well-defined learning objectives in advance. Moreover, a conference represents only a small amount of resources compared to the average annual research budget.

INTENTIONAL LEARNING

As in the case of all the already mentioned forms of learning – i. e. informal, non-formal and formal –, intentional and accidental learning are mutually exclusive. Intentional learning is defined as the set of activities of a learner whose explicit aim is that of achieving one or more pre-defined objectives (Conner, 2005). This theoretical definition is somehow compatible with informal, formal and non-formal learning. The theoretical definition of intentional learning represents an across-the-board concept having some points in common with the above mentioned learning processes (Fahey and Prusak, 1998; Tuomi, 1999; Alavi and Leidner, 2011; Twigg, 1994; OECD, 2010; Conner and Clawson, 2004; Conner, 2004; Olaniyi, 2015) – e. g. it depends on individuals learning needs and knowledge background, context, emerging technologies and society development.

The learning objective of developing new knowledge and skills, which may result potentially useful in accomplishing job tasks, lead learners to pay attention to a variety of resources linked to different forms of learning (Reischmann, 1986; Reischmann, 2004a; Reischmann, 2004b; Reischmann, 2011). In fact, learning outcomes generally arise from combined learning efforts, but still they come from an intentional approach represented by unifying learning objectives.

However, intentional learning can not be excluded from the empirical analysis of learning patterns of conference participants, due to its potential overlapping with the informal learning theory in some learning environments.

ACCIDENTAL LEARNING

Accidental (or incidental) learning is related to unexpected or not intended acquisition of knowledge or skills (Conner, 2005). The theoretical definition highlights how accidental learning should occur within everyday activities, otherwise extraordinary efforts may lead an apparently accidental learning process to fall under non-accidental learning.

Incidental learning is defined as an additional and unexpected learning, irrespective of whether the learning setting is informal, non-formal or formal. Some authors, among which UNESCO (2005), use the term “random learning”. It is an unintentional process which potentially happens in daily life, independently of place and time.

As in the case of informal learning, it is not organized, unstructured, but differs from informal learning, which is potentially intentional (UNESCO, 2005). It is often related to accomplishing job tasks (Kerka, 2000; Cahonn, 1995; Baskett, 1993; Leroux and Lafleur, 1995) and may imply significant social interactions (Baskett, 1993; Rogers, 1997; van den Tillaart, van den Berg and Warmerdam, 1998).

Accidental learning may also concern with consolidated concepts which have never been considered under a different perspective before. This learning phenomenon goes under the name of “critical personal experience”, which is a kind of unexpected learning by experience regarding existing concepts never seen under another standpoint (Reischmann, 1986; Reischmann, 2004a; Reischmann, 2004b; Reischmann, 2011).

Non-intentional learning is intended to be a “by-product” of teacher-learner or learner-learner interactions, performed job tasks, trial and error and other similar activities related to experience-based learning (Marsick and Watkins, 2001; Gruber, Mandl and Oberholzner, 2008).

As in the case of intentional learning, incidental learning shows complementary overlapping features with the informal learning theory, thus it should not be discarded when analyzing learning behaviors of conference participants.

METHODOLOGICAL SECTION

In this section the choice of the specific research methods is briefly discussed.

In a conference setting, knowledge generation, upgrading and sharing is always triggered by intentional efforts planned by conference organizers and arising from knowledge conflicts among participants (Engeström, 2000). However, planned triggers may fail if conference participants do not perceive the need of developing or deepening hot knowledge topics. In this case, organizers may be partially responsible for the lack of intelligent behavior of academicians, which tend to follow the non-triggering context rules of the conference (Aramo-Immonen, Jussila and Huhtamäki, 2014).

Since the learning setting affects the way people participate in the conference activities, emerging technologies and tools may help involving conference attendees and make them acting intelligently. In particular, OSNs communities allow, or better, encourage attendees to express their perceptions and thoughts more than in a real-world context (Aramo-Immonen, Jussila and Huhtamäki, 2014).

In light of the above mentioned reflections, conference organizers started leveraging OSNs communities and using social media tools and technologies. The main aim is that of fostering knowledge generation, upgrading and sharing and encouraging informal learning in project work contexts such as academic conferences (Jussila, Huhtamäki, Kärkkäinen and Still, 2013). Social media activities may also bring forward the triggering efforts, before the starting of the conference. Twitter accounts and Facebook communities, among others, allow organizers to address in advance hot knowledge topics to be further deepened during informal learning process, thus shaping the whole learning path of the conference community.

RESEARCH METHOD

Informal learning interactions among conference participants can be studied empirically by extracting data from ad hoc OSNs communities, thus assuming the existence of case studies endowed with data about professional networks (Card, Mackinlay and Shneiderman, 1999; Benbasat, Goldstein and Mead, 1987). In particular, this work is based on the visualization and analysis (Ware, 2004) of a conference-related Facebook community - i. e. RSAC 2015 - during 40 days of online communication, before the starting of the academic event. The adopted research method is compliant with the data science research approach (Hey, Tansley and Tolle, 2009) and the use of data collection and extraction methods and tools from online sources (Davenport, 2014).

CONTEXT-DEPENDENT METHODOLOGICAL ISSUES RELATED TO THE SPECIFIC CASE STUDY

The chosen case study concerns the organization of the upcoming RSA Conference 2015 (hereinafter RSAC) to be held at the Moscone Center in San Francisco (U.S.A.), 20-24 April 2015. The informal learning setting is triggered by organizers and participants on the Facebook community “RSA Conference” (Facebook ID 70343649637). The main hashtag about the conference on Facebook is #RSAC. It is an annually organized conference gathering luminaries, experts, companies and scholars interested in the information security agenda worldwide. The board organizes also other annual industry events in the U.S., Europe and Asia. RSA Conference is developed annually around the emerging and most important IT security's issues and aims at training and establishing connections among participants worldwide. Even if social media collect only a quota of overall informal learning interactions, the RSAC is attended mostly by connected people willing to share knowledge and learn new things about IT security. Therefore, the community object of the study – which counts on more than 8,000 users - and the chosen data collection and extraction method are able to ensure a huge and representative quantity of data to be analyzed.

DATA COLLECTION AND EXTRACTION

Data have been collected and extracted through the NetVizz app v1.05 (for pages and groups only) (Rieder, 2013) by logging in into Facebook with a generic user account. NetVizz extracts data from Facebook for research purposes and it is written and maintained by Professor Bernhard Rieder. NetVizz data are reliable and specifically geared to research activities. Data are compatible with most network analysis softwares (Rieder, 2013) such as Gephi (Bastian, Heymann and Jacomy, 2009), which was chosen as the open source software for data visualization and analysis. Gephi was chosen due to its full compliance with the key features of any exploration tool – e. g. the quality and quantity of implemented algorithms and filters, personalization options, flexibility, scalability, WYSIWYG and user-friendly software. Data and information reported in this section about the NetVizz query ensure transparency and reproducibility of the empirical study proposed in this paper.

RESULTS AND FINDINGS

Gephi counts 900 nodes and 1,984 directed edges in the resulting graph. First, authors measured graph density in order to understand how close the graph is to being complete. Graph density of 0.002 shows a lack of connection among the more than 8,000 users interested in the social media activity of the conference. This may reveal a failure of event organizers while attempting to trigger informal learning process on social media. Nonetheless, data related to detailed characteristics of users interactions became recently unavailable since Facebook changed its privacy policy, as detailed in Section V.

In light of this missing data, authors started seeking possible strongly and weakly connected components in the network (Tarjan, 1972). Weakly connected components are 20, while strongly connected ones are 900. Graph density and connected components analysis may suggest that many sub-networks have a strong inclination to stand separate from each other, though most of them show strongly tied intra-component relationships. This may indicate that informal learning interactions on social media tend to be restricted to well-defined sub-networks. Yet available data do not allow to understand whether such sub-networks are “virtual copies” of real-world communities of academicians or represent alternative groups of Facebook users attending the same event. However, in order to further prove the existence of sub-communities in this network, authors analyze modularity that is the community detection algorithm in order to identify the real formation of sub-communities, which could possibly overlap some connected components. Such an analysis is conducted by adopting standard

parameters and resolution values (Blondel, Guillaume, Lambiotte and Lefebvre, 2008; Lambiotte, Delvenne and Barahona, 2009). Results tend to confirm the overlapping between weakly connected components analysis and community detection, since the algorithms count 20 weakly connected components and 29 sub-communities (modularity values of 0.462).

The number of shortest paths is 73, the network diameter is 2 and the average path length is 1.1232876712328768.

Ultimately the overall analysis of the network, including also HITS (Brandes, 2001; Kleinberg, 1999) – i. e. Hubs and Authority –, PageRank distribution (Brin and Page, 1998) and centrality measures (Brandes, 2001; Kleinberg, 1999) – i. e. Betweenness, Closeness and Eccentricity –, shows that there is a number of disconnected components and a high degree of connectedness within most components.

DISCUSSION AND CONCLUSIONS

Limitations to this work are mainly related to the difficult identification of hot knowledge topics, since the NetVizz app and, hence, Gephi are not allowed to extract and manage such kind of data from Facebook. However, the research design proved to be useful and reliable since it provides field scholars with the opportunity of deepening specific users interactions characteristics and, thus of identifying in advance possible sub-networks of professionals having research interests in common. This way, event managers could use such data in order to increase attendees satisfaction by means of organizing and facilitating during the conference further (informal) meetings among the members of each sub-network.

Moreover, the adopted software solutions can identify non topic-related social media streams and conference managers may further benefit from the addition of a semantic engine layer, which could be helpful for conducting future research works in the field of education.

In light of this, the approach proposed in this work proved to get round the exogenous obstacle, that is the changes in external processes concerning Facebook privacy policy. Ultimately, the research methodology showed to strengthen its degree of reliability, since it holds true also when the expected quality of available data changes.

By a research method standpoint, this work deepens an emerging methodological approach consisting of an exploratory study in the field of informal learning conducted by using visual analysis of small data gathered from online sources. Moreover, it represents one of the possible applications of emerging studies of informal learning in OSNs communities. It helps also filling an existing gap in literature, since such a kind of works have never been realized before, and provides methods for detecting learning patterns from pre-events social media activities. In light of this, it may represent a solid basis for the development of future researches in this field and for their application to other areas. Finally, other studies may build on it in order to develop detection tools and methods for conference hot topics prediction. Future research efforts may also lead to better define in advance potential sub-communities of learners attending informal events.

References

- Alavi Maryam, Leidner Dorothy E. (2001). *Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues*. MIS Quarterly, Vol. 25, No. 1, pp. 107-136.
- Allen, I. Elaine, Seaman, Jeff (2007). *Online Nation: Five Years of Growth in Online Learning*. Sloan Consortium, ISBN-978-1-9345-0501-4.
- Aramo-Immonen H., Jussila J., Huhtamäki J. (2014). *Visualizing Informal Learning Behavior from Conference Participants Twitter Data*. TEEM '14 Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality, Pages 603-610.
- Baskett, H. K. M. (1993). *Workplace Factors Which Enhance Self-directed Learning*. Paper presented to the Seventh International Symposium on Self-Directed Learning, West Palm Beach, FL, January 21-23. (ED 359 354).
- Bastian M., Heymann S. and Jacomy M. (2009). *Gephi: An Open Source Software for Exploring and Manipulating Networks*. Proceedings of the Third International ICWSM Conference.
- Benbasat, I., Goldstein, D.K. and Mead, M. (1987). *The case research strategy in studies of information systems*. MIS Quarterly, 369–386.
- Blondel Vincent D., Guillaume Jean-Loup, Lambiotte Renaud, Lefebvre Etienne (2008). *Fast unfolding of communities in large networks*. In Journal of Statistical Mechanics: Theory and Experiment (10), P1000.
- Brandes Ulrik (2001). *A Faster Algorithm for Betweenness Centrality*. in Journal of Mathematical Sociology 25(2):163-177.
- Brin Sergey, Page Lawrence (1998). *The Anatomy of a Large-Scale Hypertextual Web Search Engine*. In

- Proceedings of the seventh International Conference on the World Wide Web (WWW1998):107-117.
- Burton-Jones, A. (2001). *The knowledge supply model: a framework for developing education and training in the new economy*. Education and Training.
- Cahoon, B. B. (1995). *Computer Skill Learning in the Workplace: A Comparative Case Study*. Ph.D. diss., University of Georgia.
- CapitalWorks (2000). *Research Note #2. Developing and Applying a Learning Effectiveness Index™*. Managing Learning for Value Creation.
- Card, S.K., Mackinlay, J.D. and Shneiderman, B. (1999). *Readings in information visualization: using vision to think*. Morgan Kaufmann Pub.
- Conner M. L. (2004). *Learn More Now: 10 Simple Steps to Learning Better, Smarter, and Faster*. Wiley.
- Conner M. (2005). In Bancheva E., Ivanova M, (2015). *Informal Learning in the Workplace*. In *Private World(s) - Gender and Informal Learning of Adults*. By Joanna Ostrouch-Kamińska, Cristina C. Vieira, Springer, Rotterdam.
- Conner M. L. and Clawson J. G. (2004). *Creating a Learning Culture: Strategy, Practice, and Technology*, Cambridge.
- Coomey M., Stephenson J. (2001). *It's all about Dialogue, Involvement, Support and Control*. In Teaching and Learning On line. J. Stephenson, Kogan Page London.
- Cropley, A.J. (1979). *Introduction*. (pp.1-6) In A.J. Cropley (ed.), *Lifelong Education: A Socktaking*. Hamburg: UNESCO.
- Cross Jay (2003a). *Informal learning, the other 80%*. Internet Time Group.
- Cross Jay (2003b). *Informal Learning: A Sound Investment*. In Chief Learning Officer Expert Column, Oct..
- Davenport, T. (2014). *Big Data at Work: Dispelling the Myths, Uncovering the Opportunities*. Harvard Business Review Press.
- Davies, A. and Brady, T. (2000). *Organisational capabilities and learning in complex product systems: towards repeatable solutions*. Research Policy. 29, 7, 931–953.
- de Castro, E. A., Rodrigues, C., Esteves, C., da Rosa Pires, A. (2000). *The triple helix model as a motor for the creative use of telematics*. Research Policy. Elsevier.
- Di Pietro, W., Anoruo, E. (2006). *Creativity, innovation, and export performance*. Journal of Policy Modeling, Elsevier.
- Dobbs, K. (2000). *Simple Moments of Learning*. Training 35, no. 1 (January): 52-58.
- Drucker, P. F. (1992). *Managing for the Future: The 1990s and Beyond*. New York: Truman Talley Books.
- EDC (1998). *The Teaching Firm: Where Productive Work and Learning Converge*. Newton, MA, Education Development Center, Inc.
- Eichinger Robert W., Lombardo Michael M. (2010). *The Career Architect Development Planner*, 5th edition, Lominger.
- Engeström, Y. (2000). *Activity theory as a framework for analyzing and redesigning work*. Ergonomics. 43, 7, 960–974.
- Fahey, L., Prusak, L. (1998). *The Eleven Deadliest Sins of Knowledge Management*. California Management Review (40:3), pp. 265-276.
- Gann, D.M., Salter, A.J. (2000). *Innovation in projectbased, service-enhanced firms: the construction of complex products and systems*. Research Policy. 29, 7, 955–972.
- Grebow David (2002). *At the Water Cooler of Learning*. From: "Transforming Culture: An Executive Briefing on the Power of Learning." Can be found on: The Battan Institute of the Darden. Business School at the University of Virginia, June.
- Gruber Elke, Mandl Irene, Oberholzner Thomas (2008). *Learning at the workplace*. In Modernising vocational education and training Fourth report on vocational education and training research in Europe: background report. Volume 2, CEDEFOP, Luxembourg: Office for Official Publications of the European Communities.
- Hey, A.J., Tansley, S. and Tolle, K.M. (2009). *The fourth paradigm: data-intensive scientific discovery*.
- Hobday, M. (2000). *The project-based organisation: an ideal form for managing complex products and systems?*. Research policy. 29, 7, 871–893.
- Iammarino, S. (2005). *An evolutionary integrated view of Regional Systems of Innovation: concepts, measures and historical perspectives*. European planning studies.
- Jeffs, T., Smith, M. K. (2005). *Informal Education. Conversation, democracy and learning*, Ticknall: Education Now.
- Jussila, J., Huhtamäki, J., Kärkkäinen, H. and Still, K. (2013). *Information visualization of Twitter data for co-organizing conferences*. Proceedings of the 17th International Academic MindTrek Conference: Making Sense of Converging Media (Tampere).
- Kerka, Sandra (2000). *Trends and Issues*. Alert No.18, Incidental learning.
- Kleinberg Jon M. (1999). *Authoritative Sources in a Hyperlinked Environment*. in Journal of the ACM 46 (5):

- 604–632.
- Lambiotte, R., Delvenne, J.-C., Barahona M. (2009). *Laplacian Dynamics and Multiscale Modular Structure in Networks*.
- Learning Guide (2004). *Sustainable learning and support in 21C enterprises*. The Netherlands.
- Leroux, J. A., and Lafleur, S. (1995). *Employability Skills: The Demands of the Workplace. Vocational Aspect of Education*. 47, no. 2: 189-196. (EJ 509 524).
- Lloyd, R. (2000). *Informal learning most effective*. Knowledge Management.
- Macey-Bruges, C. (2001). *Carnival as inclusive education: exploring carnival arts in the curriculum*. Forum.
- Marsick, V.J.; Watkins, K.E. (2001). Informal and incidental learning. *New Directions for Adult and Continuing Education*, Vol. 89, pp. 25-34.
- Mosher Bob (2004a). Educators of the Future II: The Journey Continues! Presentation on CompTIA.
- Mosher Bob (2004b). *The Power of Informal Learning*. Column in Chief Learning Officer, July. Can be found on: www.clomedia.com
- Nyerere, J.K. (1979). *The overall educational conception*. (pp.17-55). In H. Hinzen and V.H. Hunsdorfer (eds.), *Education for liberation and development*. Hamburg: UNESCO.
- OECD (2010). *Recognising Non-Formal and Informal Learning: Outcomes, Policies and Practices*. ISBN: 9789264063846.
- Okedara, J.T. (1980). *The Achievements of 1970/75 and 1978/80 National Development Plans in Relation to Adult Education in Nigeria*. *West African Journal of Education*, 21 (3): 1-4.
- Olaniyi F. O. (2015). *The Relevance of Learning Theories in Adult and Non-Formal Education*. *Journal of Educational and Social Research*, Vol. 5, N. 1, MCSER Publishing, Rome-Italy.
- Palmieri Roberto, Giglio Carlo (2014). *Seeking the stakeholder-oriented value of innovation: a CKI perspective*. *Measuring Business Excellence*, Vol. 18 Iss: 1, pp.35 – 44.
- Prencipe, A. and Tell, F. (2001). *Inter-project learning: processes and outcomes of knowledge codification in project-based firms*. *Research policy*. 30, 9, 1373–1394.
- Popper, M. and Lipshitz, R. (1998). *Organizational learning mechanisms a structural and cultural approach to organizational learning*. *The Journal of Applied Behavioral Science*. 34, 2, 161–179.
- Radcliffe D. J., Colleta N. J. (1989). *Non-formal Education*. In Titmus C.J. (ed). *Lifelong Education for Adults: An International Handbook*, Oxford: Pergamon Press.
- Raybould, R. (1995). *Performance Support Engineering: An Emerging Development Methodology for Enabling Organizational Learning*. *Performance Improvement Quarterly*, vol 8(1) pp. 7-2.
- Reischmann, J. (1986). *Learning 'en passant': The Forgotten Dimension*. Paper presented at the Conference of the American Adult and Continuing Education, Hollywood Florida <http://www.uni-bamberg.de/fileadmin/andragogik/08/andragogik/aktuelles/86AAACEHollywood.pdf>.
- Reischmann, J. (2004a). *Vom "Lernen en passant zum kompositionellen Lernen"*. *Untersuchung entgrenzter Lernformen*. In *Grundlagen der Weiterbildung -Zeitschrift*. 15. Jg., H. 2, S. 92-95.
- Reischmann, J. (2004b). *Andragogy. History, Meaning, Context, Function*. Internetpublication. Available at: <http://www.andragogy.net>. Version Sept. 9.
- Reischmann, J. (2011). *Learning to the power of ten - who is offering more?*. In M. Kozikowski (ed) (2011) *Study on the move, for everyone, anytime anywhere. A source book for informal learning*. EU Commission Lifelong Learning Programme EASY project LLP 2008 – 3427,
- Rieder B. (2013). *Studying Facebook via data extraction: the Netvizz application*. In *WebSci '13 Proceedings of the 5th Annual ACM Web Science Conference* (pp. 346-355). New York: ACM.
- Rogers, A. (1997). *Learning: Can We Change the Discourse?*. *Adults Learning* 8, no. 5 (January): 116-117. (EJ 540 449).
- Sawyer, R. K. (2006). *Educating for innovation*. Thinking skills and creativity. Elsevier.
- Skule, S., Reichborn, A. (2002). *Learning-conducive work: a survey of learning conditions in Norwegian Workplaces*. Luxembourg: EUR-OP (Cedefop Panorama, 30).
- Takeuchi, H. (2006). *The new dynamism of the knowledge creating company*. In Japan, moving toward a more advanced knowledge economy: advanced knowledge-creating companies. Volume 2. Eds. H. Takeuchi & T. Shibata. Washington: World Bank. 1-9.
- Tarjan Robert (1972). *Depth-First Search and Linear Graph Algorithms*. In *SIAM Journal on Computing* 1 (2): 146–160.
- Tuomi, I. (1999). *Data is More Than Knowledge: Implications of the Reversed Hierarchy for Knowledge Management and Organizational Memory*. In *Proceedings of the Thirty-Second Hawaii International Conference on Systems Sciences*, IEEE Computer Society Press, Los Alamitos, CA.
- Twigg, Carol A. (1994). *The Changing Definition of Learning*. *EDUCOM Review*, v. 29 n. 4 p. 23-25. http://www.projecteasy.eu/content/e1810/Easy_Handbook_EN.pdf
- UNESCO (1997). *Hamburg Declaration of 1997*. In Timothy Denis Ireland Carlos Humberto Spezia (2014), *Adult Education In Retrospective 60 Years Of Confitea*, Brasilia.

- UNESCO (2005). *NFE-MIS Handbook. Developing a Sub-National Non-Formal Education Management Information System*. Module 1. Paris: UNESCO, Division of Basic Education.
- Vader Wanetta (1998). *Informal Learning*. The National Research Network on New Approaches to Lifelong Learning (NALL) at OISE/UT, Canada.
- van den Tillaart, H., van den Berg, S., and Warmerdam, J. (1998). *Work and Learning in Micro-enterprises in the Printing Industry*. Thessaloniki, Greece: European Centre for the Development of Vocational Training. (ED 426-230).
- Ware, C. (2004). *Information Visualization: Perception for Design*. Elsevier.
- Yusuf, S. (2009). *From creativity to innovation*. Technology in Society. Elsevier.

Innovation, Knowledge And Multicultural Management Influence On Intellectual Capital In Industrial Enterprises

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ABSTRACT

The article is dedicated to the continual research in the area of knowledge management and intellectual capital in Slovak industrial enterprises during the period 2005-2012. The first stage of the research was to design the research framework, based on the analysis of scholarly works, consisted of the five main areas: strategy, culture, structure, technologies and knowledge assets. This framework was lately applied in the quantitative research of the knowledge management implementation in industrial enterprises in 2007 and was repeated in 2012. Extension of the research from 2007 was carried out in 2011 in the context of research focused on knowledge management maturity in Slovak industrial enterprises. This quantitative research clearly illustrates positive tendencies for the incorporation of the knowledge management strategy into the corporate strategy, implementation of the standards for knowledge management as well as the change in the attitude of the top management to knowledge management. Involvement of companies in the knowledge management initiatives also illustrates how important is the knowledge possessed by the employees. This aspect of knowledge management, defined as knowledge continuity management was analysed in the survey carried out in 2012. The research was focused on the employees' adaptation process as well as on the release process. Differences have been identified in the case of the preferences of the knowledge assets during the employee release process between the management levels. In this survey enablers and barriers of the knowledge sharing process have also been analysed. Thus another aspect of knowledge management was analysed, defined as the influence of the multicultural/intercultural environment, specifically the influence upon innovation and competitiveness.

Keywords: knowledge management, knowledge management maturity, knowledge management continuity, multicultural/intercultural environment, innovation, competitiveness.

INTRODUCTION

The article is based on knowledge management research in Slovak industrial enterprises that was conducted during the period 2005 to 2014 at the Institute of Industrial engineering and management. The first research was an informative study, inspired by (Hujňák and Hujňák, 2002), which focused on the analysis of knowledge management maturity in Slovak industrial enterprises. The results of the research show that there is a very low awareness in industrial enterprises of the possible knowledge management influence on their innovation potential and competitiveness. The obtained results correspond with the innovation statistics whereby during the period 1999-2004 only about 25% of industrial enterprises declared to have any innovation activity (Figure 1).

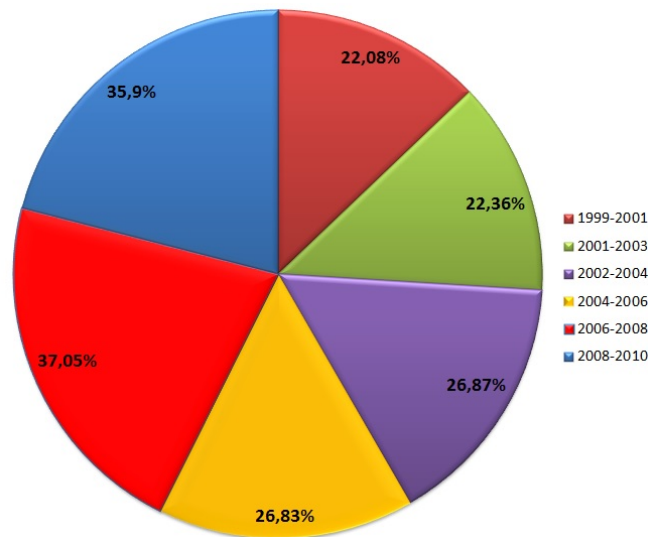


Figure 1: Enterprises with innovation activity: share of all number of enterprises in %, (Slovstat, 2014)

The concluded results subsequently provided an impulse for the further research directions in the area of knowledge management in industrial enterprises.

RESEARCH FRAMEWORK

For the purpose of the research framework design, the authors analysed knowledge management literature from different disciplines to identify the core concepts and perspectives. In this section, some key knowledge management concepts and their implications upon the applied research framework will be discussed.

As a first step in the research framework design, the Rubenstein-Montano et al. (2001) division of knowledge management frameworks was used comprising of:

- Prescriptive
- Descriptive
- Hybrids.

According to Rubenstein-Montano et al. (2001) prescriptive frameworks are often task-based and neglect other aspects of knowledge management. Hence, they do not provide a comprehensive, holistic approach to knowledge management. The frameworks include a set of activities for knowledge management where the emphasis is on the knowledge cycle. That is, they address how knowledge flows and is manipulated in the organization without consideration of factors that influence the knowledge cycle.

On the other hand, descriptive and hybrid frameworks acknowledge non-task-oriented aspects of knowledge management such as culture, linking knowledge management to strategic business objectives, and the need to include feedback loops for responding to changes in the knowledge management environment. These feedback loops address issues of adaptability and responsiveness for enhanced outcomes of knowledge management efforts (Rubenstein-Montano et al. 2001).

For the purpose of the research descriptive and hybrid frameworks were studied starting with the Nonaka and Takeuchi (1995) SECI model and also its modification described by Nonaka et al. (2000).

From this concept the structure of the knowledge assets approach was adopted (Figure 2).

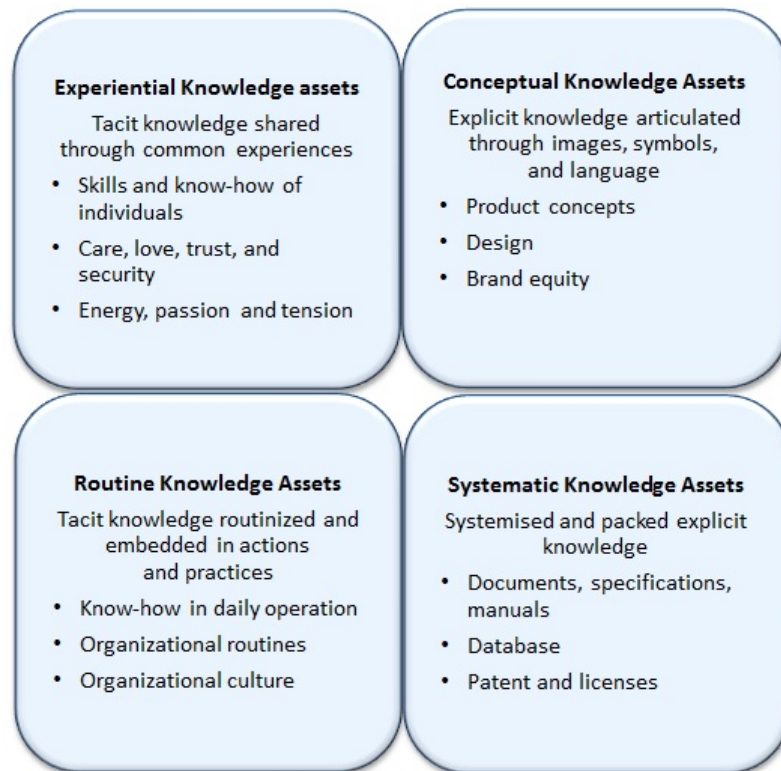


Figure 2: Four categories of knowledge assets. Adapted from: (Nonaka et al, 2000)

The second concept of the knowledge management framework that was incorporated within the research framework was the BSI PAS 2001 (Kelleher and Levene, 2001) pillars of knowledge management comprised of:

- Culture
- Structure
- Technology.

Whereas for culture the framework is comprised of:

- Excellence (Innovation, Learning, Agility)
- Teamwork (Relationship, Respect, Sharing)
- Leadership (Courage, Vision, Integrity).

As for the technology framework the spectrum of knowledge management applications (Binney, 2001) was adopted, comprised of:

- Transactional
- Analytical
- Asset management
- Process based
- Developmental
- Innovation/creation knowledge management.

For the purpose of the research it was also important to analyse the perception of knowledge management by the firm top management transferred to the vision, mission and strategy. For this purpose the M. J Earl (2001) definition of knowledge management schools was applied:

- Technocratic
- Economic
- Behavioural.

The philosophy of the technocratic school is focused on codification, connectivity and capability, whereas the economic school focuses on the commercialization, and behaviour upon the connectivity, contactivity and consciousness (Earl, 2001).

Based on the above described concepts and frameworks the first research framework for the analysis of knowledge management implementation in Slovak industrial enterprises was adapted (Figure 3).

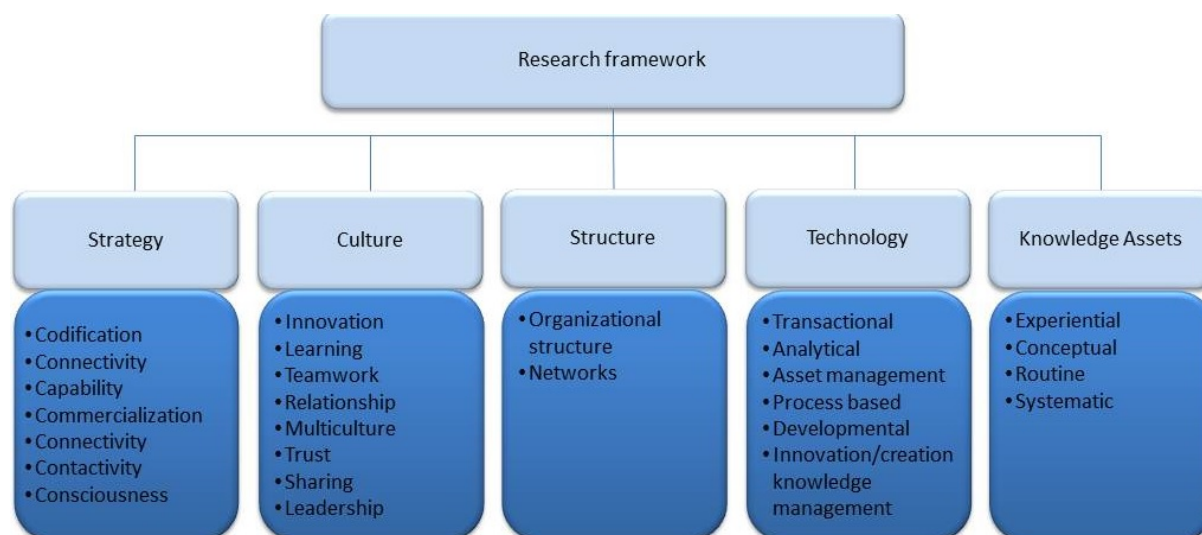


Figure 3: Research framework for the analysis of knowledge management implementation in Slovak industrial enterprises

This framework was subsequently used for the design of the questionnaires for the quantitative analysis.

QUANTITATIVE RESEARCH OF KNOWLEDGE MANAGEMENT IN SLOVAK INDUSTRIAL ENTERPRISES (2007, 2012)

The framework for the research of knowledge management in Slovak industrial enterprises was for the first time applied in 2007 and in the revised form in 2012. In both cases the conducted questionnaire were divided into 6 parts:

- Common questions
- Innovation
- Knowledge management
- Learning
- Human resources
- ICT.

In 2007, because of the range of the questions (92 multiple choice questions), an interview was used as the preferred method of the questioning. Overall 39 questionnaires for the further quantitative analysis were utilised. In 2012, after the revision of the questionnaire (a decrease in the number of the questions to 27), and an unsuccessful effort to conduct the interviews in the same enterprises as in 2007, the method of the questioning was changed to an online-administered survey. For the quantitative analysis 36 questionnaires were used. Due to differences in the questioning method, as well as in the size of the sample, the results of the comparative analysis have been regarded only as informative, nevertheless some tendencies have been clearly recognised (Table 1).

Table 1: Survey on knowledge management in Slovak industrial enterprises 2007 and 2012

Negative tendencies		
	2007	2012
Moderate profit	61%	35%
Moderate loss	5%	18%
Investment in the technology innovation	37%	21%
Positive tendencies		
KM strategy	26%	45%
ICT innovation	20%	37%
Process innovation	21%	32%

A decrease of profit levels and an increase of the financial loss in industrial enterprises can be assumed as the impact of the global financial crisis during 2007 and 2008. As a positive tendency during the crisis, the authors

considered a higher level of perceived knowledge management as a benefit for the organization competitiveness. This was reflected in the increased number of companies adopting a knowledge management strategy and the investment in innovation which was directly linked with the knowledge assets.

QUANTITATIVE RESEARCH OF KNOWLEDGE MANAGEMENT MATURITY IN SLOVAK INDUSTRIAL ENTERPRISES (2009-2011)

Results of the research from 2007 have shown that the industrial enterprises have or are starting initiatives and activities towards implementing knowledge management. One of the goals of the dissertation thesis of P. Gabriš (2011), under the supervision of J. Šujanová, was to identify and map existing knowledge management activities in Slovak industrial enterprises and compare them with the existing knowledge management maturity models. As a basis the following models were used:

- CMM (SEI, 2002)
- KMMM (K3M) (Ehms and Langen, 2002)
- KMCA (Lin, 2007)
- Lee and Kim model (Lee and Kim, 2002)
- DM-CMM (Kaner and Karni, 2004).

Shown in Table 2 is an overview of the selected models and their scope.

Table 2: Knowledge management maturity models

Model	Scope	Number of levels
CMM (SEI, 2002)	<ul style="list-style-type: none"> • Process mapping • Process management • Related technological, knowledge and organizational tools 	6
KMMM (K3M) (Ehms and Langen, 2002)	<ul style="list-style-type: none"> • Knowledge processes • Knowledge workers • Knowledge ICT • Vision and strategy • Knowledge culture • Continual improvement 	5
KMCA (Lin, 2007)	<ul style="list-style-type: none"> • Knowledge culture • Knowledge processes • Human resources • Knowledge ICT 	5
Lee and Kim model (Lee and Kim, 2002)	<ul style="list-style-type: none"> • Knowledge processes • Innovation • Human resources • Knowledge content • Knowledge ICT 	3
DM-CMM (Kaner and Karni, 2004)	<ul style="list-style-type: none"> • Information and knowledge environment • Multidimensional approach 	5

To ensure continuity with the existing research framework the utilised questionnaire placed the emphasis on:

- Support and orientation of the knowledge management strategy
- Knowledge management aspects in the organizational culture
- Innovation activities
- Knowledge and information accessibility
- Knowledge assets and their utilisation
- Knowledge management processes and tools
- Knowledge management influence on the competitiveness.

For the analysis, questionnaires from 83 industrial enterprises were utilised and results were published in Šujanová et al. (2012). In this survey, 35% of the companies declared that they have a strategy and formal rules for knowledge management (the level of the strategy implementation was recognized as very high in 5.38% of cases and high in 22% of cases). Comparing these results with the research conducted in 2007, a higher

percentage was evident, whereas in 2007 it was only 26% of companies, and less than in 2012 with 45% (Figure 4).

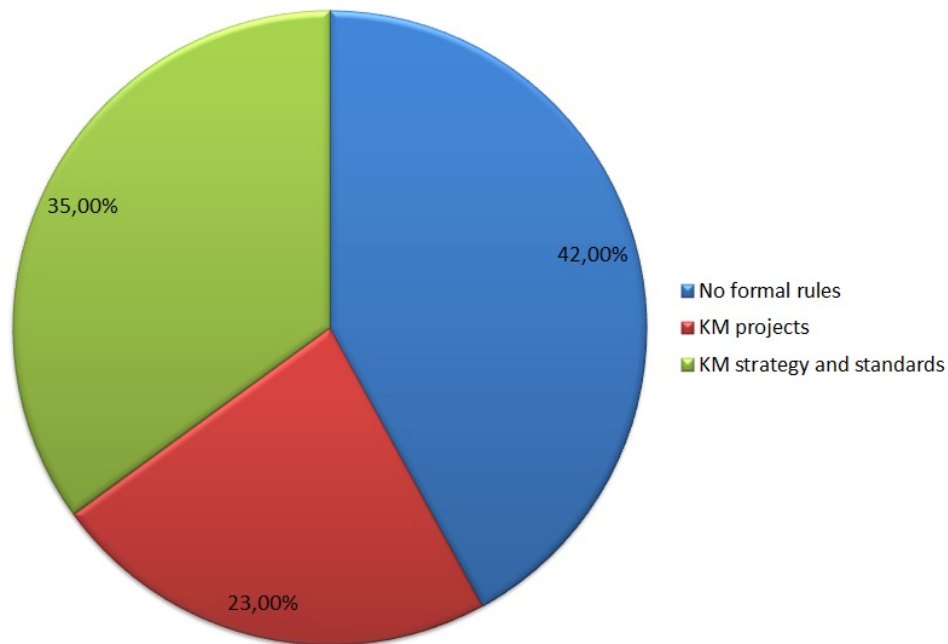


Figure 4: Knowledge management initiatives in Slovak industrial enterprises (year 2010)

In this survey, a high number of companies also stated having innovation activities whereas only 18.28% of them had no innovation activity (Figure 5).

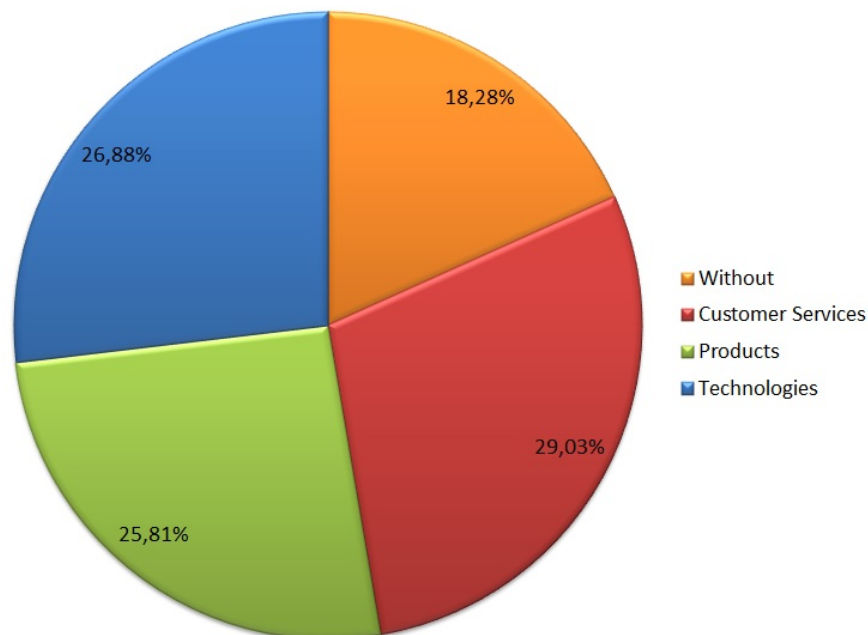


Figure 5: Innovation activities of Slovak industrial enterprises in 2010

The tendency towards more knowledge intensive innovation within customer services and products can also be observed.

QUANTITATIVE RESEARCH OF KNOWLEDGE ASSET MANAGEMENT AND HUMAN RESOURCES IN SLOVAK INDUSTRIAL ENTERPRISES (2010-2012)

An extension of the research focusing on the knowledge management maturity process was research studying the knowledge assets management from the human resources perspective with an emphasis on the knowledge management continuity. This research was conducted as a dissertation thesis by M. Bielik Marettová (2012),

supervised by J. Šujanová. An organization can apply different approaches to knowledge asset management, whereas knowledge continuity management incorporates the knowledge transfer either in one generation of employees or between different generations of employees. In the case of knowledge continuity management, the human resource department plays a crucial role (Beazley et al. 2002). In this quantitative research, 102 Slovak industrial enterprises participated. Results from the research have been published in Bielik Marettová et al. (2012). Besides the areas described in the research framework for knowledge management in Slovak industrial enterprises, the research was concentrated on the specific areas of knowledge including:

- Customer knowledge
- Product and services knowledge
- Process knowledge
- Competitor knowledge
- Professional knowledge.

The other areas of the research were the styles of organizational culture and the application of ICT in knowledge processes.

For knowledge continuity management it is important to define formal rules for the knowledge storage and transfer during the process of employee release. Information and communication technologies have been recognized in this research as important tools for knowledge management. Companies have different preferences in their selected ICT tools for knowledge processes support (Figure 7).

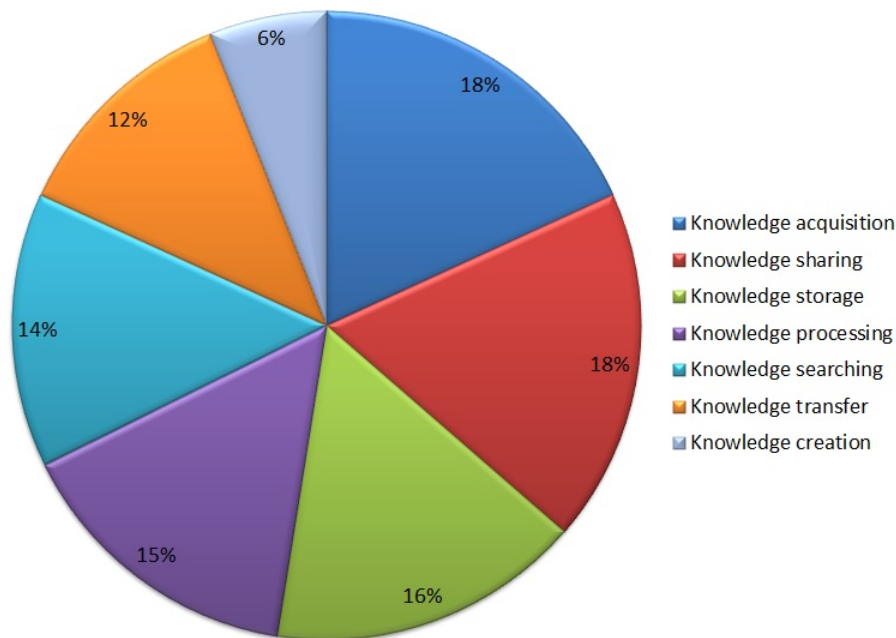


Figure 7: ICT tools application in knowledge processes

From Figure 7, it is evident that the preferences for the application of ICT tools in knowledge acquisition, sharing, storage, processing, searching and transfer are around 15% ($\pm 3\%$), however for knowledge creation only 6%.

Distinctions have been identified also in the knowledge transfer during the employee release process from different levels of the management. For the top management the emphasis is placed on the customer knowledge (24%), for the middle management it is the product/service knowledge (24%), process knowledge (25%) and professional knowledge (23%). In the case of lower management it is process knowledge (57%) and professional knowledge (52%) (Figure 8). Another interesting conclusion is that the knowledge of the lower management (about 50%) is more important than the knowledge possessed by the top and middle management (about 25%).

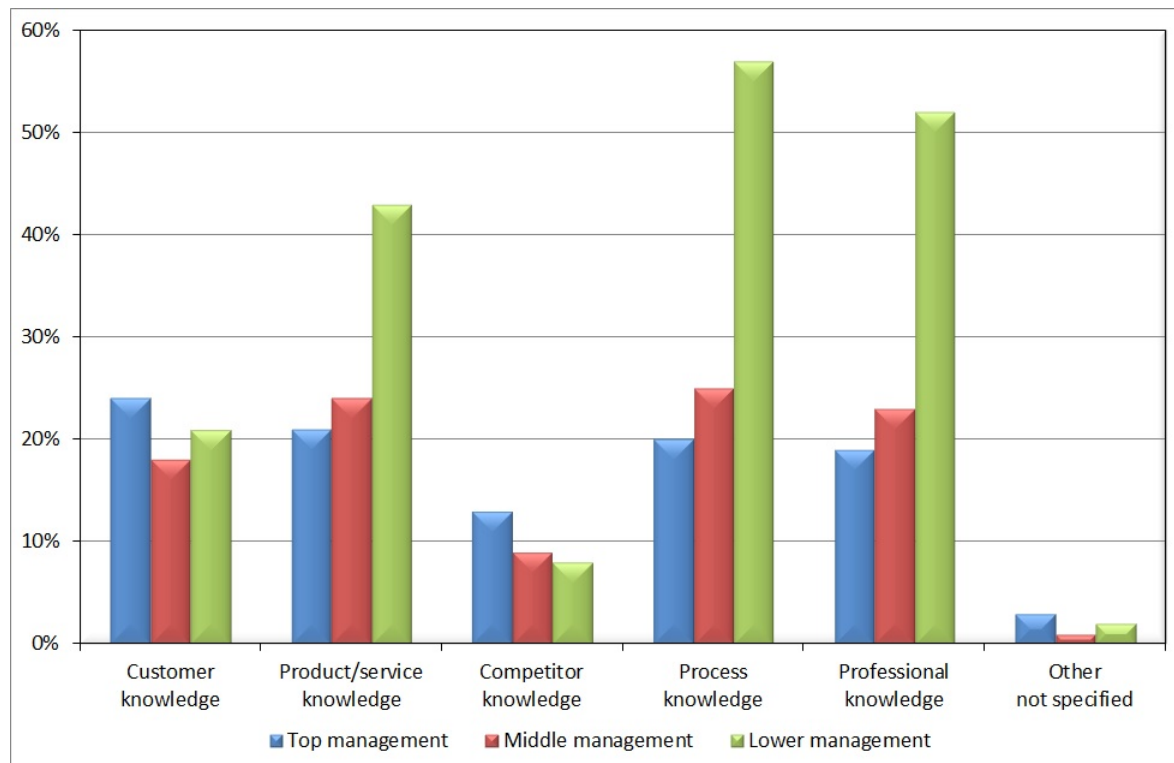


Figure 8: Preferences of the knowledge assets during the employee release process for management levels

The research also identified the problems related with organizational culture, specifically knowledge sharing barriers. As the biggest barrier, the reluctance of employees to share knowledge (42%) was indicated, however 30% of the respondents identified the problem of knowledge measurement, and 17% have identified a problem in the ICT architecture (Figure 9).

In contrast to knowledge sharing barriers, the knowledge sharing enablers were also identified as the collaboration tools (team work, informal groups and networks) and were recognised as important by 59% of respondents (Figure 10).

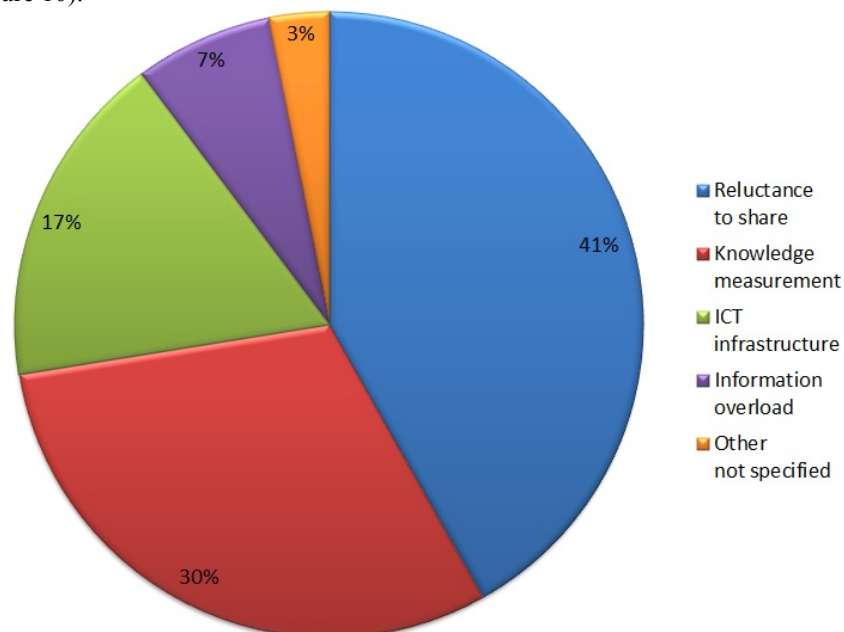


Figure 9: Knowledge sharing barriers

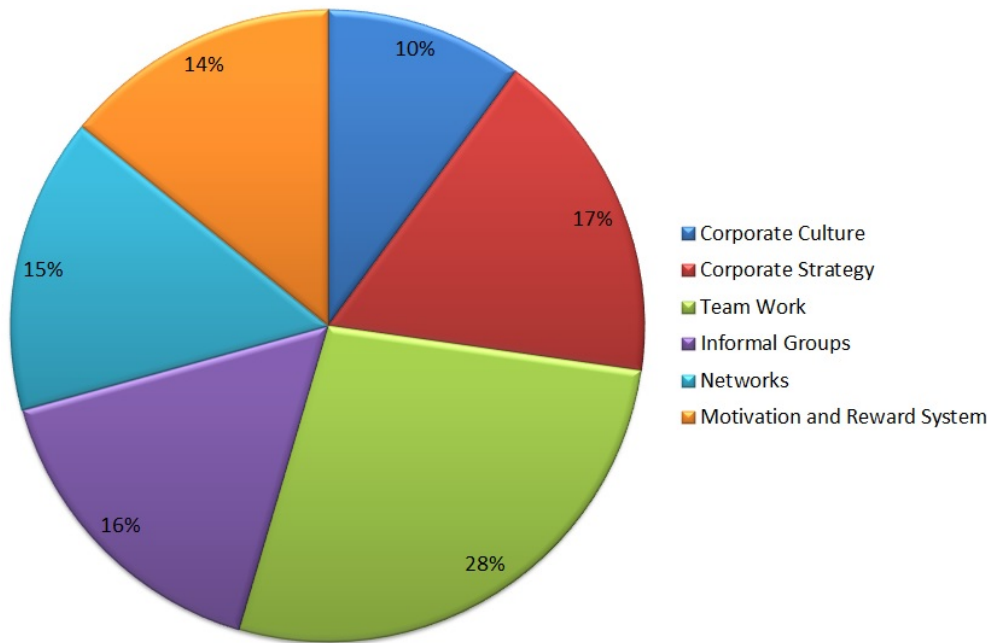


Figure 10: Knowledge sharing enablers

QUANTITATIVE RESEARCH OF MULTICULTURAL ASPECTS IN SLOVAK INDUSTRIAL ENTERPRISES (2010)

After the regime change in 1989 foreign investment and the ownership of Slovak industrial enterprises has steadily increased. Research focused on the corporate culture or managerial competencies in Slovak industrial enterprises (see e.g. Čambál (2010) and Cagánová et al. (2010)) illustrate the relationship between knowledge management and multicultural competencies. As it was stated by N. Holden (2002), cross-cultural management can no longer be seen as the management of cultural differences in popular interpretation. It must be related to managerial activity in the new geo-economy with its emphasis on global networking, organisational learning and knowledge management. This knowledge management perspective of the multicultural management has been applied in the survey carried out by D. Cagánová (2011) from June 2010 to November 2010. The pre-test of the questionnaire was carried out in June and July, followed by the questionnaire and interview survey. After the questionnaire was conducted, quantitative and qualitative analysis was carried out based on the data obtained from employees in industrial enterprises, as well as research institutions and universities. The survey sample of 124 respondents consisted of top, middle and low management and common employees in industrial enterprises, universities and research institutions (and another 10%).

The questionnaire regarding interculturality/multiculturality had the following structure:

General information (basic information about employees, contained 13 items)

The main part consisted of 5 sections:

1. Corporate culture.
2. Practices and ideal concept of intercultural/multicultural education.
3. Interculturality/Multiculturality.
4. Diversity.
5. Gender Diversity.

The results of the questionnaire indicated that from the 124 total respondents, 115 of them were from Europe. Two respondents each came from Asia, Australasia and America. However, America was not subdivided into North and South America thus no knowledge is available where these respondents came from. In addition there was a sole respondent from Africa.

More than half of the respondents, 78 (62.90%) came from Slovakia. Following this, respondents from the UK were the next most numerous with 6 (4.84%), then Austria, 5 (4.03%) and then the Czech Republic, Germany and Poland each having 4 respondents (3.23%). There were respondents from 16 countries named on the questionnaire and 3 respondents from countries not included on the list.

The interculturality/Multiculturality part of the survey focused on the evaluation of the experiences from the multicultural environment, mainly if this issue is important for the organization, how it is displayed in the organization, managerial competencies and their importance in multicultural environment, the influence of multicultural environment on different aspects such as: economic results, innovation and competitiveness, and

the managerial abilities of intercultural managers. Respondents have observed a connection between the healthy multicultural/intercultural environment and economic performance of the company. Twenty one respondents (16.94%) reported that economic parameters had a very strong influence on a healthy multicultural/intercultural environment. Over half of respondents (64, 51.61%) replied that economic parameters had a strong influence, 35 respondents (28.23%) reported that it had an average influence and 2 respondents felt it had a weak influence. Only 1 respondent (0.81%) believed that economic parameters had no influence on a healthy multicultural/intercultural environment (Figure 11).

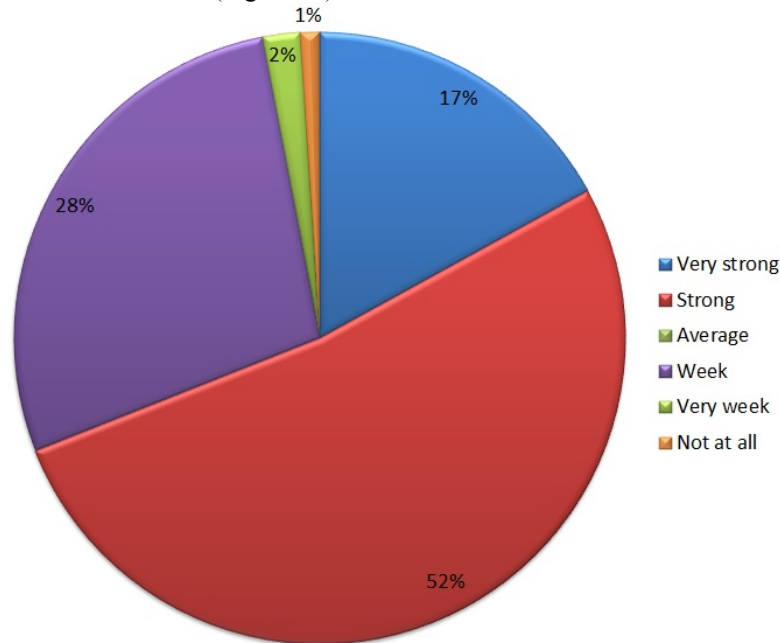


Figure 11: The influence of economic parameters on healthy intercultural/multicultural environment

In the case of the influence of the healthy multicultural/intercultural environment on innovation over a third of respondents (33.87%) reported that it had a very strong influence or strong influence (44.35%). About 19% of respondents believed that a healthy multicultural/intercultural environment has an average influence on innovation, and meanwhile 3 respondents believed that a healthy multicultural/intercultural environment had a weak effect, and 1 respondent reported that a healthy multicultural/intercultural environment had no influence at all on innovation (Figure 12).

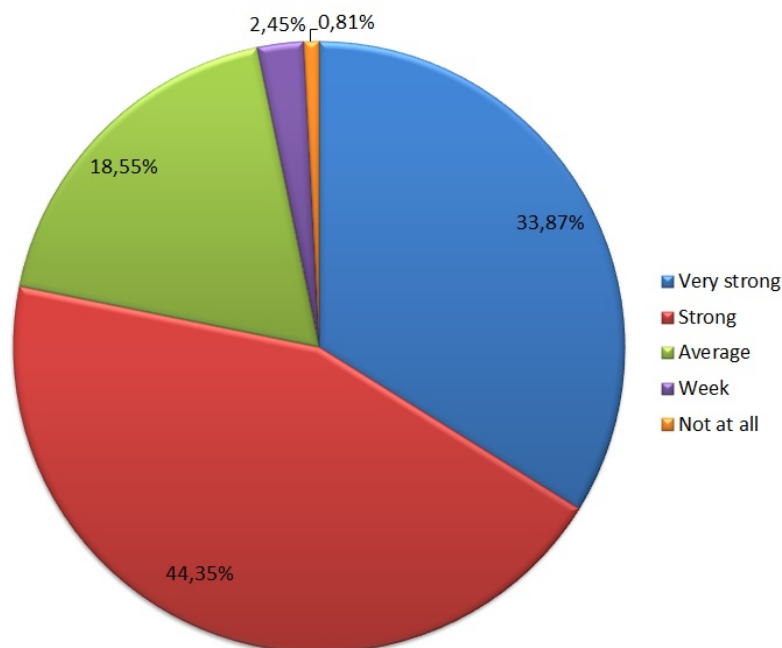


Figure 12: The influence of a healthy multicultural/intercultural environment on innovation.

Similar results have been obtained in the case of the influence of the healthy multicultural/intercultural environment on the company competitiveness where over a third of respondents (34.68%) believed that it had a very strong influence, while 45.16% believed that it had a strong influence. Therefore over three quarters of respondents valued a healthy multicultural/intercultural environment highly as a factor to competitiveness. About 16% of respondents felt a healthy multicultural/intercultural environment had an average influence and 3.23% believed it had a weak influence. Only 1 respondent (0.81%) felt a healthy multicultural/intercultural environment had no influence at all on competitiveness (Figure 13).

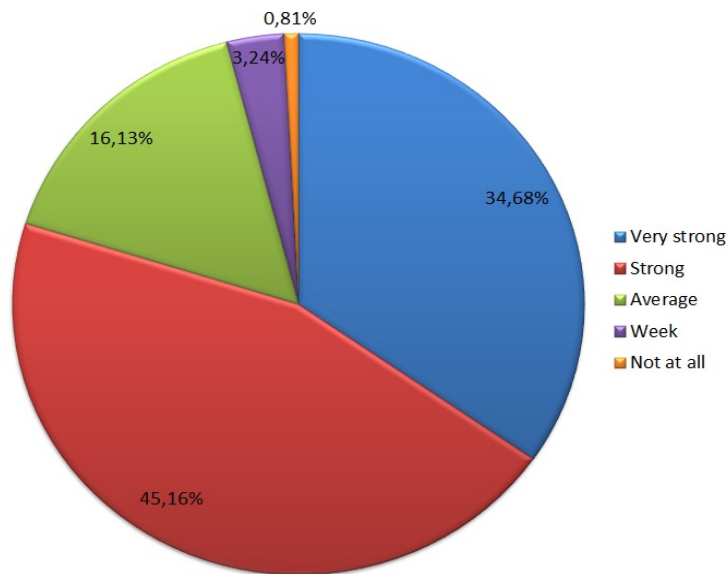


Figure 13: The influence of a healthy multicultural/intercultural environment on competitiveness

CONCLUSIONS

This article represents an overview of the research carried out at the Institute of Industrial Engineering and Management at the Faculty of Materials Science and Technology in Trnava, the Slovak University of Technology in Bratislava, Slovakia. The continuity of the research is based on the designed framework for the research of knowledge management in Slovak industrial enterprises which provided the opportunity to manage very specific and focused analysis of the very different aspects of knowledge management. Moreover, it allowed monitoring of the tendencies of the knowledge management application in industrial enterprises. At the beginning the perception of knowledge management influence on innovation and competitiveness had been very weak and knowledge management had been recognised as a tool to decrease the expenses of the company. During the period 2005-2012 this perception changed and companies started to become aware of the importance of knowledge assets, and started to concentrate on knowledge intensive processes and innovation. The results also placed an emphasis on innovation in networks and multicultural companies as well as on the knowledge management in project management.

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References

- HUJŇÁK, P and HJŇÁK, J. (2002) *Průzkum stavu managementu znalostí u českých podniků: Akcelerace managementu znalostí* [online]. Accessible at: http://www.perpartes.cz/publikace/Pr%C5%AFzkumy/Průzkum_stavu_managementu_znalosti_2002.pdf.
- SLOVSTAT (2014) Statistical office of the Slovak Republic. [online]. Accessible at: <http://slovak.statistics.sk>.
- RUBENSTEIN-MONTANO, B. LIEBOWITZ, J. BUCHWALTER, J. MCCAW, D. NEWMAN, B and REBECK, K (2001) A systems thinking framework for knowledge management. *Decision Support Systems* [online]. 5., vol. 31, no. 1, pp. 5–16 [accessed. 10. May 2014]. ISSN 01679236. Accessible at: doi: 10.1016/S0167-9236(00)00116-0.
- NONAKA, I and TAKEUCHI, H (1995) *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. B.m.: Oxford University Press. ISBN 978-0195092691.

- NONAKA, I, TOYAMA, R and KONNO, N (2000) SECI, Ba and Leadership: a Unified Model of Dynamic Knowledge Creation. *Long Range Planning* [online]. 2., vol. 33, no. 1, pp. 5–34. ISSN 00246301. Accessible at: doi:10.1016/S0024-6301(99)00115-6
- KELLEHER, D and LEVENE, S (2001) *PAS 2001:2001 - Knowledge management*. B.m.: BSI. ISBN 0 580 38412 8.
- BINNEY, D (2001) The knowledge management spectrum – understanding the KM landscape. *Journal of Knowledge Management* [online]. B.m.: MCB UP Ltd, 3.1., vol. 5, no. 1, pp. 33–42. ISSN 1367-3270. Accessible at: doi: 10.1108/13673270110384383.
- EARL, M (2001) Knowledge Management Strategies: Toward a Taxonomy. *Journal of Management Information Systems* [online]. B.m.: M. E. Sharpe, Inc., 31.5., vol. 18, no. 1, pp. 215–233. ISSN 0742-1222. Accessible at: <http://dl.acm.org/citation.cfm?id=1289679.1289688>.
- GABRIŠ, P (2011) *Proposal of the methodology for the evaluation of knowledge management maturity in Slovak industrial enterprises*. Dissertation thesis. - Trnava: STU in Bratislava MTF UPMK. 151 p., CD-ROM.
- SEI - SOFTWARE ENGINEERING INSTITUTE, 2002. *Maturity model CMMI*. [on-line]. Accessible at: <http://www.systemonline.cz/sprava-it/cmmi-model-hodnoceni-vyspelostiprocessu-1.htm>.
- EHMS, K and LANGEN, M (2002) *Holistic Development of Knowledge Management with KMMM* [online]. Accessible at: http://providersedge.com/docs/km_articles/Holistic_Development_of_KM_with_KMMM.pdf.
- LIN, H-F (2007). A stage model of knowledge management: an empirical investigation of process and effectiveness. *Journal of Information Science* [online]. 29.5., vol. 33, no. 6, pp. 643–659. ISSN 0165-5515. Accessible at: doi:10.1177/0165551506076395.
- LEE, J-H and KIM, Y-G (2002) A Stage Model of Organizational Knowledge Management: A Latent Content Analysis. *IE Interfaces* [online]. vol. 13, no. 1, pp. 1–9. ISSN 1225-0996. Accessible at: http://astp.jst.go.jp/modules/search/DocumentDetail/1225-0996%2B%2540%2B_13_1_A%2BStage%2BModel%2Bof%2BOrganizational%2BKnowledge%2BManagement%253A%2BA%2BLatent%2BContent%2BAnalysis_N%252FA.
- KANER, M and KARNI, R (2004) A capability maturity model for knowledge-based decision making. *Information-Knowledge-Systems Management* [online]. B.m.: IOS Press, 1.12., vol. 4, no. 4, pp. 225–252 [accessed. 15. June 2014]. ISSN 1389-1995. Available at: <http://dl.acm.org/citation.cfm?id=1096325.1096328>.
- ŠUJANOVÁ, J, GABRIŠ, P, PAVLENDÁ, P, LIČKO, M and STASIAK-BETLEJEWSKA, R. (2012) Aspects of Knowledge Management in Slovak Industrial Enterprises. In: *European Conference on Knowledge Management*. B.m.: Academic Conferences & Publishing International Ltd., p. 1135–1144.
- BIELIK MARETTOVÁ, M (2012) *Proposal of the methodology for the knowledge continuity management in Slovak industrial enterprises*. Dissertation thesis. - Trnava : STU in Bratislava MTF UPMK, 142 p. CD-ROM.
- BEAZLEY, H. BOEISCH, J and HARDEN, D. (2002) *Continuity Management: Preserving Corporate Knowledge and Productivity When Employees Leave*. B.m.: Wiley. ISBN 978-0-471-21906-4.
- BIELIK MARETTOVÁ, M, MALÁ, J. and ŠUJANOVÁ, J. (2012) Knowledge continuity management implementation in Slovak industrial enterprises. In: *Manažment ľudského potenciálu v podniku* Banská Bystrica : Matej Bel University in Banská Bystrica. ISBN 978-80-557-0361-9. - pp. 244-251.
- CAGÁNOVÁ, D, ŠUJANOVÁ, J and LENHARDTOVÁ, Z (2010) The multicultural environment influence on innovation and knowledge management in the Slovak Republic. In: *Annals of DAAAM & Proceedings*; 2010. Vienna: DAAAM International, p. 0113–0114.
- CAMBÁL, M and CAGÁNOVÁ, D. (2010) Corporate culture influence on effective initialization and application of knowledge management in enterprises. *Proceedings of the European Conference on Knowledge Management*, ECKM [online]. pp. 176–181. ISSN 20488963. Accessible at: <http://www.scopus.com/inward/record.url?eid=2-s2.0-84871096479&partnerID=tZOtx3y1>.
- HOLDEN, N. (2002) *Cross-cultural Management: A Knowledge Management Perspective*. B.m.: Pearson Education. ISBN 027364680X.
- CAGÁNOVÁ, D. (2011) *Multiculturalism and Industrial Enterprises*. - 1st Edition. - Köthen: Hochschule Anhalt. - 156 p. - (Scientific monographs). - ISBN 978-3-86011-041-6.

Innovation Of Educational Process As A Factor Of Enhancing Competitiveness

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ABSTRACT

The article focuses on the issues of higher education and its priorities. It defines the factors affecting competitiveness of universities. The study contains findings of several conducted primary surveys, in both the target group of commercial entities and university students. The study puts into context readiness of graduates for their start in practical business, requirements for the practice with regard to professional and personal qualities of graduates, and the current issues of graduates in the managements of companies and organizations. The objective of the study is to analyze the current impact of the educational process quality in the criterion of preparing students for their start in the world of business and practice, and the requirements on university graduates. The output of the study is an evaluation model measuring the efficiency of innovative features in teaching and leading to enhancing competitiveness of educational institutions, to brand building of educational institutions, in the current competitive environment and in relation to the decline of the demographic curve seeming to become the strategically fundamental task of universities.

INTRODUCTION

Current higher education is undergoing changes reflecting in the social, economical and political development of the society. “The long-term intention of educational and scientific, research, development and innovative, artistic and other creative activities of higher education institutions for the period 2016 – 2020“ understood primarily as:

- the added value for each student, ie. a comprehensive set of knowledge, skills and competences of a graduate which they would not be able to acquire, if they did not study at university,
- the relevancy of offered education, ie. the level in which the acquired study results correspond to the needs of the life in 21st century,
- the openness of a university towards the internal and external environment and the ability to reflect learning needs of every student regardless of their background and with the full use of their potential,
- the compliance of education with academic values and the ability of a university to bring up individual, independent and self-confident individuals who think critically about the society and who actively contribute to its development (Marketing, Science and Inspirations, 2012)

University preparation of students for the practical business life, competitiveness of graduates, cooperation with commercial entities is thus “the mantra” of modern schooling and of modern economy. If the cooperation barriers are overcome and both sides enter into business relations, then these relations may be very effective (Juříková, 2014).

METHODOLOGY

The study presents the results of several primary surveys that were conducted at the Faculty of Multimedia Communications at Tomas Bata University in Zlín. The aim of the surveys was to find out what the real conditions and possibilities are for the cooperation of the university and commercial entities. A questionnaire survey was conducted which investigated the barriers and options for the cooperation of the university and companies in the Zlín Region. 105 companies (from different professions and of different sizes) were addressed within the survey; the survey was a questionnaire face to face survey having been carried out in the period of November 2012 to June 2013. The main objective of the questionnaire survey was to analyze the possibilities for cooperation between companies and the university, to disclose any obstacles and the potential for streamlining or enhancing the cooperation and communication.

RESEARCH OUTPUTS

The marketing research among commercial entities showed the composition of companies according to the individual professions in the region. The most respondents were from the rubber and plastics industry (16 % of the respondents), from the metal industry (13 % of the respondents) and from the electrical industry (more than

11 % of the respondents). The most frequent type of cooperation is between a company and one particular university faculty or department (26 % of the companies). In 25 % cooperation with two faculties/departments was recorded. 26 % of the companies find their motivation for cooperation with the university in solutions of their research needs, for 14 % of the companies it is the area of student internships, assigning bachelor's or master's theses. 5 % of the responded companies are motivated for cooperation if they are addressed directly by the university or if they are in a need of solving their own employability policy. Other reasons for cooperation include social responsibility, cooperation within a cluster, regional proximity and visibility of the company. Most companies cooperate with the university in the field of solving of their own needs by means of master's and dissertation theses (43 %), in the field of student support by means of mentoring, internships, scholarships (35 %) and as lecturers within lectures and workshops (15 %). 57 % of the companies would like to cooperate on projects receiving national or international grants and in the area of education of employees, 51 % of the companies would like to utilize expert advice in their own project-solving issues, and 42 % of the companies would like to cooperate with the university on measuring and testing of their products in the university laboratories. On the contrary, 70% of the companies have no interest in cooperation in the area of intellectual property protection, commercialization of research findings (67 %) and of memberships in industrial, scientific and professional councils (67 % of the respondents). The following chart shows other areas of cooperation and the interest of the companies in the area of future cooperation.

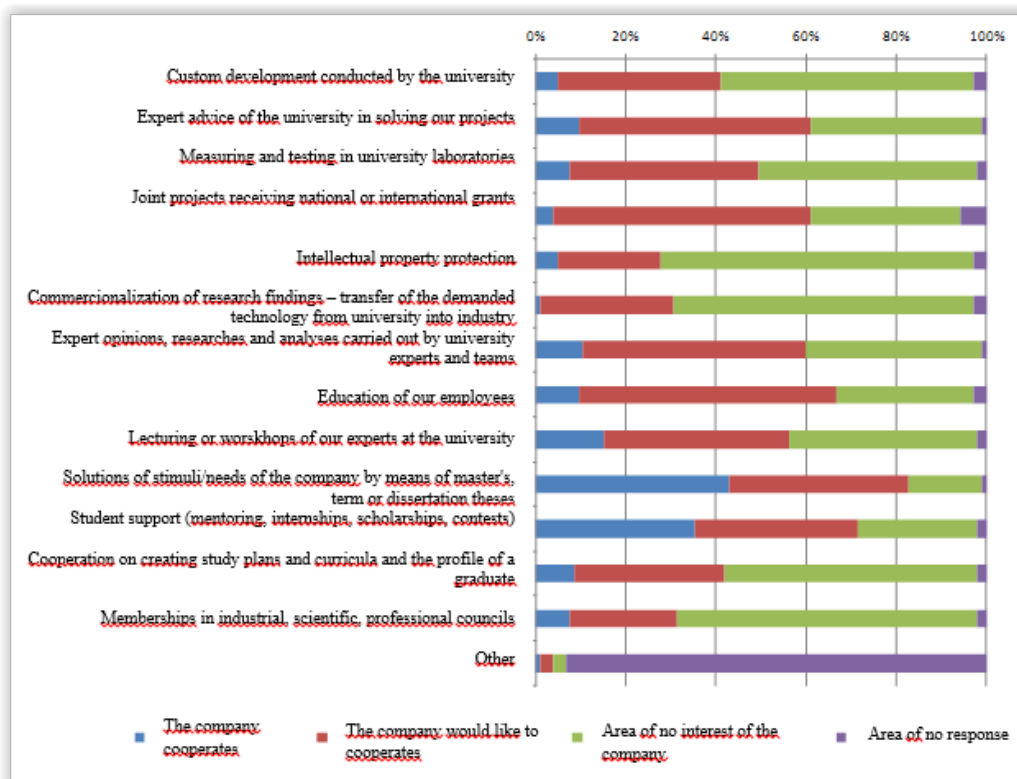


Table 1: Possible areas of cooperation of companies with the university (n=105)

The research results also showed the interest in the area in which the companies would like to start their cooperation with the university. Most of the surveyed companies have their interest in cooperation in marketing and management (59 %), marketing communicatinos (54 %) and in manufacturing engineering (44 % of the respondents).

In the current cooperation of companies and universities there are also barriers. 20 % of the companies responded that in cooperation of the company and the university there is an obstacle especially in the lack of a contact person on the side of the university who would be able and willing to initiate a cooperation with the company. On the website of the university it is often rather difficult to find a specific person suitable for cooperation. The companies experience a cooperation barrier also in the unavailability or incompleteness of information from the side of the university. Most companies (90% of the respondents) would like to be informed on the current cooperation possibilities via e-mail, only a low priority was expressed by the companies in printed bulletins, leaflets and social networks.

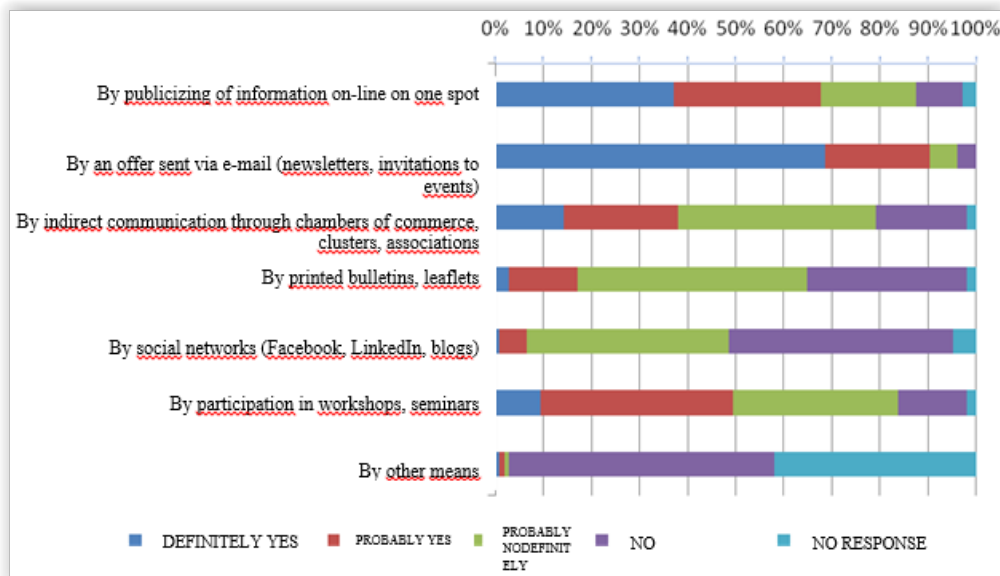
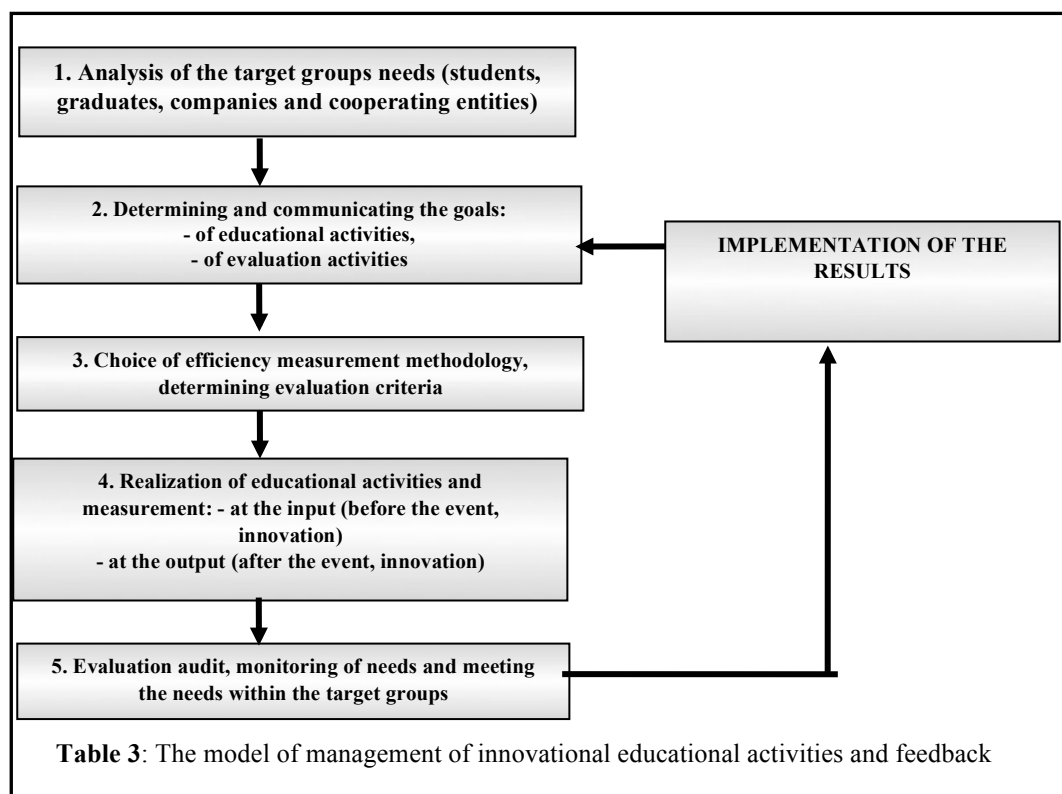


Table2: Preferred means of acquiring information on the possibilities of cooperation with the university (n=105)

The research yielded some interesting results. On both sides, ie. in the companies as well as on the side of the university, there exists some interest in cooperation. Both parties realize the significance and benefit of mutual cooperation. The most frequent cooperation barriers on the side of companies is the unawareness of a particular person who would be in charge of mutual cooperation, companies and businesses do not know who they should address. Another barrier is the unavailable or incomplete information on the offer of cooperation, of particular projects from the university. The companies are also afraid of the tedious administrative tasks related to starting cooperation, which becomes a frequent barrier on both sides. From the university's perspective, a communication barrier are above all the administrative demands as well as the time demands for those who cooperate on a specific project. A barrier may also be seen in an uncertain financial reward for the cooperation, which is not a part of academic performance. The greatest cooperation potential is seen by the companies in marketing and marketing communications and industrial engineering.

However, there is not one ideal cooperation model. The people and their will to cooperate, their readiness, communication openness and straightforward approach are the key. People on both sides, on the side of a company as well as on the side of the university. In spite of the fact that starting cooperation may sometimes be a lengthy and demanding process, it is worth it. Trying to understand the needs of the other party, to respect their diversity and at the same time to be searching for solutions convenient for all, that is often the highest value of cooperation.

The task of universities is to educate future professionals in their field of interest, to provide students with the maximum theoretical knowledge and to interlink this knowledge with practical skills so that they would be ready for the real world of business and practice. The inclusion of workshops led by experts from practice directly into schooling is an effective way of the cohesion of the academic environment theoretical base with the practical focus of professionals from the real world of business.



An advantage of this model is a high added value for students who have the option to complement their theoretical knowledge with practical skills, who have an opportunity to come to understand the particular field and profession in practice, and they will thus obtain an overview of the current trends in the field. Workshops become an opportunity to gain a comprehensive and real overview of the field and thus fulfill the requirements for education of experts in the spirit of principles of economical knowledge (Jurášková, 2011).

INNOVATION AND EVALUATION ACTIVITIES MODEL FOR INNOVATION OF THE EDUCATIONAL PROCESS

The environment of educational institutions is in many aspects comparable to corporate practice. Projects contributing to the improvement of the knowledgeable society, ie. projects with the aim to educate, should as well as in the corporate environment be subject to feedback process management, ie. the measurement of efficiency. We can learn from the theory of schooling and teaching management about the assessed criteria or indicators, research methodology, proven business practices will further complement the procedural framework of the discussed issue. After taking the practical approach to university learning into account, the following scheme of the cohesion and succession of sub-educational and evaluation activities may be created (Juříková, 2010).

The target groups of an educational process may be analyzed on the basis of the study of the secondary literature data such as of strategic documentation of institutions or professions (fields in which education will be further based), sociodemographic statistics, internal statistics (eg. of the number of applicants and graduates of a study program in relation to the market environment), prediction of experts or also of results of ad hoc conducted surveys or long-term monitorings finding the extent and possibilities for the satisfaction of educational needs (Šula, Banyár, 2014). In the case of primary “terrain” surveys, the questionnaire survey method is most frequently selected when potential target groups and cooperating subjects are addressed with the request to fill in questions relating to the focus of the project. The questionnaire survey often becomes a communication tool causing interest of the concerned parties in planned activities. By processing the analysis of educational needs, the success of education becomes significantly impacted already at the stage of choice of topics, field or forms of an educational activity. The evaluation process then allows to enhance the efficiency of implementation of the innovative features into education, allows to respond to the current situation within the particular field, the needs of the practice and at the same time immensely increases the quality of the educational process (Šramová, 2013). Within a complex perception, this is an important feature for enhancing competitiveness of an educational institution.

CONCLUSION

Like other areas of the society, also education undergoes changes that it must respond to. Universities at present do not have an easy position, they are forced to implement marketing principles for their school management, to build the university brand and perceive all students as the university's clients. At the same time they are forced to ensure a high-quality education, implement creative and innovative features into their teaching, but also to promote outputs of their creative and scientific activities by means of communication tools. To ensure meeting educational and creative goals, they must utilize opportunities of the change and transform, innovate their activities. It is necessary to focus on creating values for students, to respond to the requirements of the practical business world, to search for possibilities and opportunities for cooperation with the world of practice, to respect the demographical development and to continuously enhance competitiveness. In terms of marketing communication to connect the internal and external image of an educational institution, to involve students, graduates as well as employees into the image building process and to motivate them to a responsible approach towards the university brand they represent. For efficient managerial decisions it is necessary to measure the results of educational and creative activities, to use analytical tools and relevant measurements to improve decision-making processes within the framework of the goals and objectives of a university. To adapt the educational process to ever-changing conditions of the market, to continuously expand abilities and skills of people through education, to use modern technology and also personal growth which is often a precondition for a responsible approach to life and business.

In accordance with the Long-term intention of a university for 2016 – 2020, the universities may be recommended with the following:

- Except for the traditional academic skills to put emphasis also on language skills and other transferable skills of graduates – eg. the ability to efficient communication, problem-solving skills and to be creative, learn independently, work in a team, manage modern technology or to communicate in a foreign language.
- To involve more the relevant parties (from among the current and former students, representatives of the practical business, users of the research and creative results and findings among the general public) into the evaluation and improvements of own activities. Evaluation processes should lead to the identification of problematic issues to which further action will be directed.
- To respond with its educational, research, development, creative and other activities to the local, regional, national and international conditions and issues.

Monitoring of the current trends and developments of the particular field, interconnection of theoretical knowledge with their practical applications, innovation of teaching through workshops, all this becomes an ultimate concept enhancing the university educational process. The role of experts from the practical life in this concept is irreplaceable. Through them students are introduced with the contemporary options for utilization of the individual marketing strategy forms, marketing communication tools in practice, their interest in the field is enhanced as well as creative processes of the teaching. Students thus become better prepared to face current issues of the field at various levels of management, they are prepared to efficiently utilize their competences, knowledge and skills, to measure their efficiency in application of thereof, to control processes by means of project management and to enhance the development of their own skills and competences in the long term.

References

- GÖTTLICHOVÁ, M., SOUKALOVÁ, R. (2015). The Impact of Effective Process of Higher education on the Quality of Human Resources in the Czech Republic. Paris: International conference on new horizons in education INTE 2014,
- JURÁŠKOVÁ, O. (2011). *Inovace výuky jako faktor zvyšování odborné přípravy studentů VŠ*, Zlín: VeRBuM, ISBN 978-80-87500-15-6.
- JUŘÍKOVÁ, M. (2014). *Inovace vzdělávacích programů jako prvek stabilizace vyššího odborného školství*, Zlín: VeRBuM, ISBN 978-80-87500-54-5.
- ŠRAMOVÁ, B. (2013), *School culture as part of Marketing-orientated approach*, In Proceedings International Conference on New Horizons in Education INTE 2013, Volume 2/3, ISSN 2146-7358.
- ŠULA, T., BANYÁR, M. (2014). The Analysis of Microsites and Their Functionality as Part of the Promotion of Higher Education Institutions, Universities and Their Individual Degree Courses, In international Journal of Education and Information technologies, Volume 8, ISSN 2074-1316.
- Marketing, Science and Inspirations, (2012). Bratislava: Univerzita Komenského v Bratislave, ISSN 1338-7944.
- Journal of Competitiveness, (2012). Zlín: Faculty of Management and Economics of Tomas Bata University, ISSN 1804-171X.

Innovative Approach In System Of Teaching Management In Field Of Railway Transport

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ABSTRACT

The article deals with innovation of the teaching management in the field of study Transport, study branch Railway transport. Department of Railway Transport, University of Žilina, Slovakia, provides teaching of management, which is focused on to application of managerial methods and approaches of quality management in conditions of railway transport. For innovative methods of teaching management can regard dynamic models that allow quality monitoring throughout transport. These innovations also bring new requirements for theoretical knowledge and practical experience of graduates of the mentioned study program. Described attitudes are being designed for students and managers of transport companies who have been seeking solutions of service quality with regard to never ending and still growing demands of customers and changes in the transport market. Currently Department of Railway Transport is preparing new software solution for teaching as the result of several significant projects which were being solved in cooperation with railway companies. The users of this new software will be able to modify dynamic models for specific needs of solving quality services in selected trains, sections and transport sessions. In this comprehensive form the study material will have unequivocal innovative character and it will enable link theoretical knowledge with practice what is one of basic pillars of effective training in current time.

Keywords: Teaching management, railway transport

INTRODUCTION

Dynamic models of service quality provide an extended view on problematic of quality. These models ensure the perception of quality by customers and changes of their needs that develop over time. In the world are famous models of Staussa and Neuhaus, Liljander and Strandvik and the many others which hasn't been used in practical operation within services of railway passenger transport (Dolinayová 2013). Therefore University of Žilina, Department of Railway transport is deals with a research of opportunities of its application and all its benefits which could lead to improvement of services in given area.

Within examining, it is about continuation of several of already implemented projects which follow on the experience from the world. In this contribution we are going to state a partial result of research in which was an effort of authors of the research about connection of model Stauss and Neuhaus with a known method FMEA (Failure Mode and Effects Analysis). FMEA has proved interesting for use in identifying deficiencies, defectiveness, elimination of bad quality already in previous projects realized by the Department of railway transport in cooperation with practice and with foreign colleagues.

Qualitative model Stauss and Neuhaus isn't based on a general allegation that a high degree of satisfaction automatically leads to high customer loyalty, where the main reason is diversity of customers' needs, situational factors and also the attractiveness of other alternatives. In research of qualitative model of satisfaction is not enough only rating of global (overall) satisfaction but much more is needed the detection of potential threats among the satisfied customers.

Marketing tools should be applied, particularly in places where the customer demonstrates a high potential of threat to the relationship (Hrašková 2013). Model distinguishes customers into 5 categories (Figure 1), and stresses that the perception of service quality is constantly changing. When the customer is satisfied, it does not mean that it will be forever, depends on many factors which his decision about using of railway transport may change.

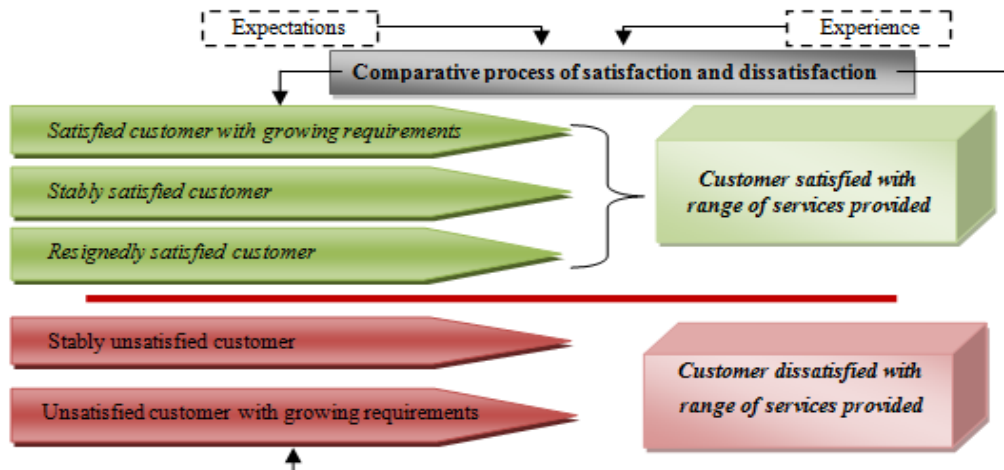


Figure 1: Graphical representation of satisfaction and dissatisfaction of passengers with the services provided

This model solves mainly dynamic aspects of quality and satisfaction in area of provided services in transportation processes of railway passenger transport from point of view evaluation of customers' satisfaction respectively dissatisfaction.

RESEARCH AT THE SPECIFIC LINE SECTIONS

Very interesting view at quality which allows characterized model, was applied on different line sections. In the research were determined several criteria which were assessed by customers but also by the employees of railway companies. It was about criteria such as safety, convenience, customer care, availability, information, continuity of rail connections, reliable (Kubasáková 2005).

Further was determined the rate of importance of individual criteria quality services before realization of transportation. Rate of importance was established on the basis of certain information which obtained and subsequently reported the participants of research so-called "degree of recognized (perceived) quality services" which depends from their personal experience with provided services or from additional services, from information that obtained about service from provider possibly from their around (Majerčák 2010). The passengers had the opportunity to express their views on the basis of point succession from 1 to 4 where they assign a level of importance and consequently level of perceptions (recognition) quality from the most important (or most acceptable) to least important (or unacceptable).

From the research indicated that the most common quality criteria which don't reach level of sufficient satisfaction of customers are availability, customer care, convenience and information. For the extent of this issue, we present the results of research that concern to availability which was defined for purpose of this research like an access to the system of public passenger transport including linking with the others kind of public passenger transport. This criterion was simultaneously marked within the rate of importance with degree 1, thus as one of the most important at surveyed sections.

The research involved 1930 participants at 8 different line sections in the Slovak Republic. From the point of view of referred criterion "accessibility" the most of participants till 875 reported that they are resignedly satisfied, i.e. they demonstrate some indifference in relation to the railway company when they know that they can't expect nothing more from the railway company. The results are shown in the Figure 2.

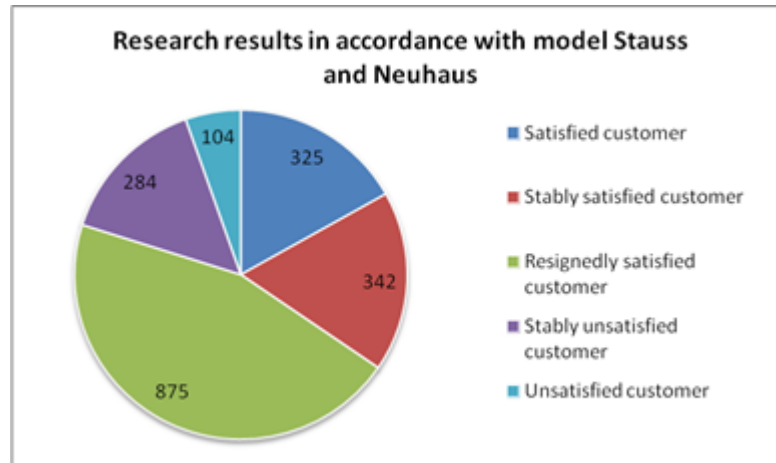


Figure 2: Research results about customer satisfaction

There is a huge scope for Railway undertaking to avert this state and improve its services, because just from this group of customers exist a big threat that they decide for another company or even another kind of transport. Customers' requirements within the criterion of availability lead to a several facts (Nedeliaková 2013). It is a low availability of stations and halts of the railway transport from terms of distance, low frequency of train connections and with it related issue of links interference, lack of continuity of train connections, delay of the trains, lack of train connections especially to the smaller towns and villages, failure to adapt train connections in terms of time and directional non-uniformity.

LINKING OF DYNAMIC MODEL AND FMEA

To achieve more comprehensive results of research was used the method of FMEA and it was connected with the dynamic model which was presented earlier. Between the basic reasons for the introduction of FMEA may be included constantly growing customer demands on the reliability and quality services of railway passenger transport (Poliak 2009). Utilization of FMEA is recommended mainly for the problem services or when there is the assumption of improving services.

The method presents team analysis of options formation of failures and mistakes in the considered process of railway transport which is connected to risks evaluation and is a starting point for realization of measures leading to mitigate these risks. Is an important part of the review of the proposal and its application in research has been detected up to 70% mismatches in quality.

Based on theoretical principles of method FMEA were designed three specific points of evaluations.

1. Meaning (importance) of mistake, i.e. factor that assessing how serious is the potential consequence of mistake for the customer. In cases when a certain mistake can cause a number of different effects, an appropriate assessment refers to the most serious consequence of mistake. Numeric expressions indicating the severity of mistakes are shown in Table 1.

Table 1: Determination the importance of the mistake

Degree	Category	Border
1	None	0-10
2	Insignificant	11-30
3	Medium serious (moderate)	31-60
4	Serious	61-80
5	Extremely serious	90-100

2. Occurrence of the mistake, i.e. probability of mistake formation caused of a certain reason and is assessed by the same way like an importance of the mistake. There occurs to the evaluation of technical possibility of mistake formation during the time of planned life of service where mainly based on experiences with similar products and thus in our case the services. When evaluating heights of very improbable mistake is taken into account the used preventive measures. Numeric representations of the probability of the occurrence of mistakes are shown in Table 2.

Table 2: Determination the occurrence of the mistake

Degree	Category	Border
1	Very improbable mistake	0-10
2	Low probability of mistake	11-30
3	Occasionally occurring mistake	31-60
4	High probability of mistake	61-80
5	Almost certain mistake	81-100

3. Probability of revealing mistakes, i.e. probability which come out from assessment of the effectiveness of existing control procedures which are used in the assessment of service design. In the case that probability of revealing mistake or its cause is high the point of evaluation is low. Conversely, a score is high, if mistake neither its cause can't be practically uncover by used control procedures. The numerical values which show the probability of revealing the cause of formed mistake are shown in Table 3.

Table 3: Revealing mistakes

Degree	Category	Border
1	Almost impossible revelation	0-10
2	Very low	11-30
3	Middle	31-60
4	High	61-80
5	Almost certain	81-100

We can determine the size of the risk degree based on the three referred probabilities. This rate of risk (or risk degree) is expressed like a multiplication all of three mentioned probabilities by form of so-called risk number. FMEA results were continuously recorded in the paper form. For the application in railway passenger transport were used several types of FMEA proposal, but every company determined by which paper form will be suitable for them.

By the connection of dynamic model and FMEA method can be achieved several advantages. On the one side there is opportunity of continuous monitoring of changing customer requirements of railway company. On the other side there is an opportunity to identify mistakes in the process (Sekulová 2013). The following Table 4 shows the part from implementation of FMEA for the quality criterion – availability.

Table 4: Part of the research results in the application of FMEA

PROCESS FMEA										
Element / Function / Requirements for process	Possible mistake	Possible consequence of the mistake	Importance	Possible causes / mechanisms of the mistake	Occurrence	Way of control / preventive control method	Way of control / detection control method	Disclosure	Recommended measures	Risk number
Title of process: Transportation of passengers by the railway passenger transport at the line section Žilina - Trenčín										
Analyzed process: Ensuring the availability of train connection										
Passengers deemed the availability of train connection as a good	Lack of continuity of train connections	Unsatisfied customers from the reason of long wait on train connection	5	An insufficient set time interval of train connections	5	Continual systemic control of making timetables	Tracking of public meaning, passengers' feedback	2	Recommended measures for carrying out the analysis of train connections, find shortages and then remove them when drawing up of a new timetable	50
Passengers deemed the availability of train connection as a good	Delay of train connections	Unsatisfied passengers and unsatisfied employees, economic damages of carrier, decrease of passengers	5	unexpected defect of the train, incidents, not submitted information about the alternative transport in the event of long delays	5	Continual watching of train delays, deducing of responsibility, compliance control	Systematic reconnaissance of management systems, eliminating of weaknesses	2	Recommended measures to implement the preventive application of replacement of parts for excessive wear (bearings), strengthen control processes, keep to the schedule of repairs and maintenance of technical equipment, subsequent provision of information about alternative transport in the case of long train delay	50
				work on railway lines, weather conditions, failures of rails / railway uppers / or technical support						

CONCLUSIONS

Methodic referred to in the contribution is a novelty in area of application of dynamic models in the railway passenger transport. It brings new view on the problem of service quality. Methodic builds on a number of previous researches conducted within Department of Railway Transport in cooperation with railway undertakings.

Linking the model Stauss and Neuhaus with FMEA method represents an universal methodic which serve for closer understanding of customer needs and more detailed diagnose of mistakes in railway operation. Operation of railway passenger transport is often a stochastic process and therefore the management of railway companies has to look for new ways of identification of "bottlenecks" and finding out new customer needs. Partial results of the research which are described in the article also provide a space for discussion in solved field which is in current time very actual from reason of necessity of support railway passenger transport at transport market.

Among the basic advantages which brings this methodic belongs mainly provision of documents for improving the quality plan, analysis or processing. Next from advantages is respecting of systemic approach which leads to the prevention of poor quality. Methodic also reduces the losses which are caused by non-quality of system and helps to increase customer satisfaction. Introduced methodic is also very important part of control system of quality services in railway company.

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References

- Dolinayová A. (2013) Possibilities of prognosis traffic demand for regional railway passenger transport. Land communications and tracks, 9(1), (pp. 59-64)
- Hrašková D., Bartošová V. (2013) Critical factors of Managing Change in the transport company. Economics - Management Spectrum: scientific journal of Faculty of Operation and Economics of Transport and Communications, University of Žilina in Žilina, 7(2), (pp.51-55)
- Kubasáková I., Šulgan M. (2005) Modern logistic system – effective customer response (ECR). Transport and communications, (pp. 5-10)
- Majerčák, J., Nedeliak, I. (2010) Practical experiences with modeling of IT systems and business processes./ Praktické skúsenosti z modelovania informačných systémov a business procesov. In: 6th Forum of rail transport, Bratislava, (pp. 81-84)
- Nedeliaková E., Dolinayová A., Nedeliak I. (2013) Methods of evaluation of the transportation services quality. University of Žilina in Žilina, EDIS
- Poliak, M. (2009) Current problems of procurement of transport services by public passenger transport. /Aktuálne problémy obstarávania dopravnej obslužnosti hromadnou osobnou dopravou. In: Current problems in transport 2009. Pardubice: Institut Jana Pernera v Praze with Přepravní laboratoří Dopravní fakulty Jana Pernera, (pp. 213-218)
- Sekulová, J., Nedeliak, I. (2013) Utilization of GAP model in providing of services in the railway freight transport. In: Perner's Contacts, 8(4), (pp. 67-75)

Interactive Learning In Slovak Educational Environment

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ABSTRACT

Teacher and his pupils are the most important factors of educational process. The present contribution introduces the concept of analysis of the relationship between teacher interaction style and social climate in the classroom. The verifying of the relationship between two indicators (interaction style and social climate in the classroom) was used by regression and correlation analysis by Pearson product-moment correlation coefficient, with graphical presentation in the form of Scatterplot with line. The author states in the conclusion the positive change in the social climate in the classroom, which is based on participation of two determining factors - teacher and his students in the interaction.

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INTRODUCTION

Teacher's typology is based on different perspectives. It may be a teacher's educational impact, his behaviour, his temperament, his qualities, working style and so on. Therefore, the teaching profession is an important factor for the education (Pasternáková, 2009, Zahatňanská, Majerníková, 2013). The presented contribution interprets the typology of a teacher based on a style that is reflected mainly in the behaviour on the education process. The primary object of this article is to describe the teacher's interaction style, especially in Slovak educational environment.

Interaction style for a teacher: "is characteristic by typical and relatively permanent personality that is showed in his teaching, behaviour and communication during the lesson. It influences both the didactic, organizational and communication activities" (Fenyvesiová, Tírpáková, 2005, p. 59). According to different definition, the teacher's interaction style is relatively typical stable teacher and this fact greatly helps students to predict the teacher's activity and prepare for it (Gavora, Mareš, Brok, 2003).

THE STUDY

What is the origin of interaction style or where does it come from? American psychiatrist Sullivan (representative of an interpersonal behaviour) introduces the concept of "interpersonal relationships", which influenced many scientist and researchers in the humanities sciences. It became a fundamental concept in the conception of many theories such as Timothy Leary's theory. The research of Leary and his working groups was mainly based on works of Sullivan and Ericson and later, it was supported by observation and categorization of interpersonal activities on psychiatric patients. His theory was developed in the 60th of the 20th century and it was published in the work *Interpersonal diagnosis of personality*.

There is a more detailed definition in the literature of interpersonal behaviour by Mlčák. He defined the interpersonal behaviour as a "set of recorded, verbally and nonverbally, consciously or unconsciously motivated expressions of man against existing real or ideal subject. In the nature a collection of expressions are always presented as a result of dynamic interaction between external and internal situational influences, relatively stable, socially relevant personality characteristics" (Mlčák, 1996, p. 152). Timothy Leary as a psychologist and a psychotherapist developed a typology of personality, which is considered to be very inspirational always for the present teaching practise. This developed typology was based on the impact of the man to the other people which is influenced especially on his own. Leary studied the interaction on his clients and through the diagnosis of personal traits he created the theoretical model consisting of two axes which are defined by two extreme points. The horizontal dimension labelled as a *proximity* connects the two extreme points: *Cooperation* and *Opposition* and vertical dimension labelled as an *influence* connects the two extreme points: *Dominance* and *Submission*. In the other literature, there is definition of these dimensions as: *Dominance – Submission* and *Hostility – Affection*. The content of these two axes is formed by personal characteristic and because of their circular arrangement of this model; it was named as *interpersonal circle* or *circumplex model* (Brok, Brekelmans, Wubbels, 2004; Mlčák, 1996, Mareš, Gavora, 2004; Gavora, Mareš, Brok, 2003).

The Leary's model of interpersonal behaviour became the theoretical foundation for Dutch researchers at the University of Utrecht (Wubbels, Brekelmans, Creton and others). Their research was based on the fact that the personality of the teacher in the classroom and his behaviour could not be examined separately. Therefore, they applied a system approach and teaching interaction and communication were perceived as a coherent system

which is composed of several factors: teacher, student and the whole class. They were also confident on the argument that system is characterized by cross-linking, and that “a change from a one element not only causes a change the other elements, but also feeds back to the element where turns originally started” (Mareš, Gavora, 2004, p. 103).

According to mentioned, we conclude the following:

- each teacher tends to a particular methods of interaction;
- methods of interaction prevail in various episodes of interaction;
- a teacher behaviour in the interaction with pupil behaviour in the classroom can be called as the teacher's interaction style.

The Dutch researchers create a model of teacher interaction behaviour such as the Leary's model on two axes. This two-dimensional model is a theoretical base for the creation eight sector classification system. Following the Leary theory and its application to the educational diagnostics became the foundation for creating the eight-dimensional typology of teacher's interaction styles:

- *Leadership, Helpful, Understanding, Student Freedom, Uncertain, Dissatisfied, Admonishing and Strict.*

The typology of teacher's interaction style is graphically represented as follows:

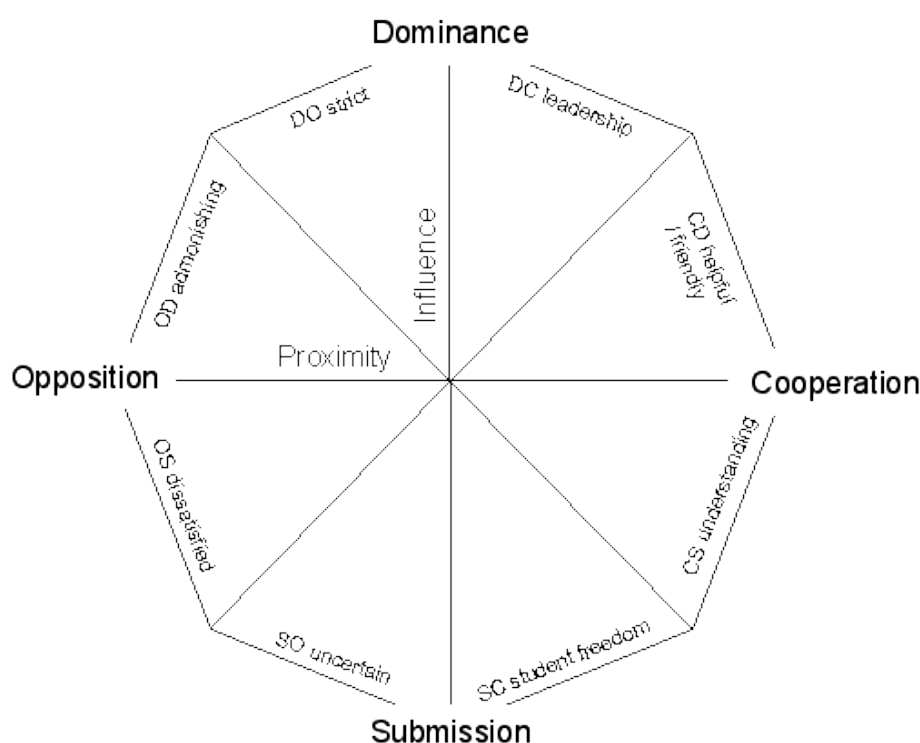


Figure 1: Teacher interaction style (Brok, Brekelmans, Wubbels, 2004)

This approach was applied into the Czech and Slovak educational environment by Gavora and Mareš (2003, 2004). The content of the variables in the model of teacher's interaction style shows the following table:

Table 1: The dimensions of variable teacher interaction style

Teacher interaction style	Dimension	Characteristic of dimension
Leadership	<i>dominance, cooperation</i>	leadership, organization
Helping friendly	<i>cooperation, dominance</i>	friendliness, gladness
Understanding	<i>cooperation, submission</i>	empathy, patience
Student freedom	<i>submission, cooperation</i>	respects freedom
Uncertain	<i>submission, opposition</i>	apology, admission a mistake
Dissatisfied	<i>opposition, submission</i>	criticism, annoyance
Admonishing	<i>opposition, dominance</i>	forbidding, castigation
Strict	<i>dominance, opposition</i>	checking, rigorous assessment

Teaching styles are variable and typical for the teacher. There are activities which teacher uses in the education, in managing learning processes and so on. They are influenced by the specifics of the teacher's personality, his

undergraduate training, his experience and conception of education (Hudáková, 2013). Teacher interaction style characterizes “typical and relatively permanent personality that shows itself in the meeting, behaviour and communication during the lesson. It affects both the educational, organizational and communication activities” (Fenyvesiová, Tirpáková, 2005). The difference between teaching style and interaction style is based on the fact the teacher interaction style is mainly determined by pupils. There is a link between teacher interaction styles and social climate of the classroom as a relatively stable long-term educational-social indicator. The class climate could be characterized by subjective evaluation summaries and self-perceptions, experiences, emotions and the interaction of all participants (Čapek, 2010, Kosturková, 2012). The research problem is focused on the relation between teacher interaction style with eight dimensions (*Leadership, Helpful, Understanding, Student Freedom, Uncertain, Dissatisfied, Admonishing and Strict*) and social climate in the classroom with six dimensions (*Order and Organization, Teacher Support, Affiliation, Involvement, Rule Clarity, Task Orientation*).

FINDINGS

The main goal is analysis of relation between two indicators: teacher interaction style and social climate in the classroom. The research problem was formulated as: *What is the relation between the teacher interaction style and social climate in the classroom?* The research problem was investigated by two questionnaires: CES (*Classroom Environment Scale*) and QTI (*Questionnaire on Teacher Interaction*).

The research question was operationalized into the eight hypotheses. A higher number of hypotheses suggested that it was not in our power to determine in advance whether they occur in the sample all kinds of teachers who meet the criteria for inclusion in the individual categories. The hypothesis no. 1 assumed that the teacher with high scores in the dimension of interaction style *Leadership* had a higher score in the dimension of social climate in the classroom *Order and Organization*, than a teacher with a low score in the dimension of interaction styles *Leadership*.

The inclusion of teachers in high score, or low score was used by the following formula:

- teacher with a high score: mean + standard deviation
- teacher with a low score: mean – standard deviation

Table 2: The summary data for the various dimensions of interaction styles secondary schools teachers

QTI	1.	2.	3.	4.	5.	6.	7.	8.
mean	3,00	3,33	3,30	2,97	0,80	0,97	0,92	1,60
SD	0,47	0,31	0,35	0,23	0,42	0,33	0,41	0,45
mean+SD	3,47	3,61	3,65	3,20	1,22	1,30	1,33	2,05
mean-SD	2,53	3,02	2,95	2,74	0,38	0,64	0,51	1,15

According Chráska (2007), the analysis depends on two basic aspects:

- finding the regression line;
- a consideration of tightness of relationship.

There has been used the Scatterplot with line to find the relationship between the various dimensions of teacher interaction style and various dimensions of the social climate in the classroom. To assess the tightness of the relationship, there has been used a table of Critical Values of the Pearson Product-Moment Correlation Coefficient. To test the statistical significance of the correlation coefficient, there was formulated zero and alternative hypothesis:

H0: The tested value of the coefficient of correlation does not confirm the relationship between the two dimensions.

HA: The tested value of the coefficient of correlation confirms the relationship between the two dimensions.

The relation between the dimension of teacher interaction style *Leadership* and dimension of social climate in the classroom *Order and Organization* is presented by following Scatterplot with line:

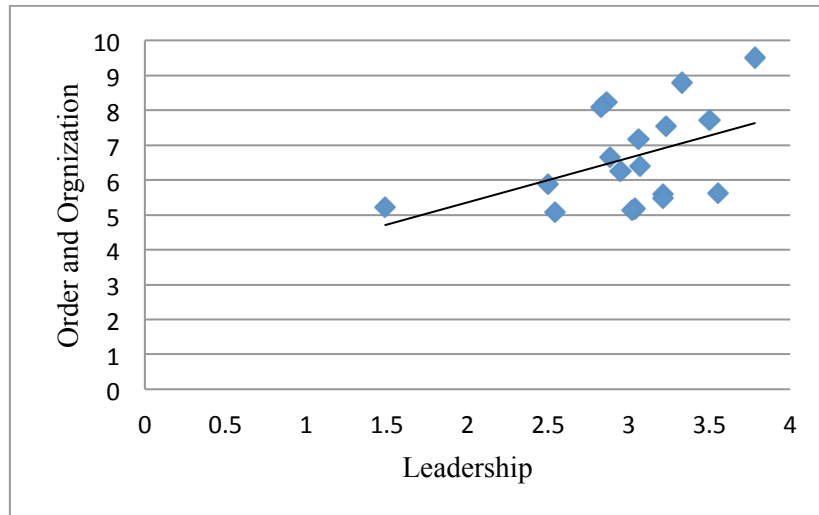


Figure 2: Scatterplot presented the relation between the dimension of teacher interaction style *Leadership* and dimension of social climate in the classroom *Order and Organization*

Due to the increasing regression line, we could assume that the coefficient of correlation is clearly positive, the slope of the line also allows us to estimate that the value of the coefficient will be neither too high nor too low. According to Rimarčík in the social sciences is "practically impossible to find two variables whose values in Scatterplot would lie on one straight line" and as he adds: "regression analysis gives us the answer to the question, how do we estimate the value of the variable Y by value variable X. However, it does not tell us how good do we estimate. The answer for this question will give us the correlation analysis by "(Rimarčík, 2006, p. 41).

The value of correlation coefficient between the dimensions *Leadership* and *Order and Organization* presents the following table:

Table 3: The correlation coefficient between the dimension *Leadership* and *Order and Organization*

	Order and Organization	Teacher Support	Affiliation	Involvement	Rule Clarity	Task Orientation
Leadership	0,458	0,331	0,273	0,779	0,794	0,582

If we compare the values with the table of critical values for the coefficients of correlation, it is clear that the dimension of *Leadership* shows high positive values in the dimension of *Involvement* and *Rule Clarity* at significance level $\alpha = 0.01$ and dimension *Task Orientation* at a significance level of $\alpha = 0.05$. Although, there is not statistically significant relationship between the dimension of interaction style *Leadership* and dimension of the social climate in the classroom *Order and Organization*, we can say that the values are very tightly below the level of significance $\alpha = 0.05$. We assume that the reason is our research sample.

The projected claim shows, that teacher with high scores in the dimension of interaction style *Leadership* has higher scores in the dimension of social climate in the classroom *Order and Organization*, than a teacher with a low score in the dimension of interaction style *Leadership*, and it has been confirmed. However, the found data of regression and correlation analysis showed following: if the teacher work would be better organized, the pupils will more orient to the roles, the rules in the classroom will be clear and their interests into the subject will be greater.

According to our findings, the most dominant dimensions of teacher interaction style are *Helpful* and *Leadership*. It means that if we want to raise the dimension *Order and Organization*, it is not sufficient for teachers being just facilitative or understanding to their pupils. According to our results the correlation coefficient is clearly positive in both cases (dimensions *Leadership* and *Strict*) so we can say following: if teachers would like to be rated as organized by their students, they should more organize their work and in particular, they should be strengthened.

5. We have verified the other hypotheses the same way. The correlation between the various dimensions of teacher interaction style and various dimensions of the social climate in the classroom are presented in following table (the critical values for Pearson Product-Moment $\alpha = 0,01$; $\alpha = 0,05$):

Table 4: The correlation between the various dimensions of teacher interaction style and various dimensions of the social climate in the classroom $\alpha = 0,01$; $\alpha = 0,05$

Social climate	Order and Organization	Teacher Support	Affiliation	Involvement	Rule Clarity	Task Orientation
Leadership	0,458	0,331	0,273	0,779	0,794	0,582
Helpful	0,392	0,778	-0,114	0,586	0,564	0,415
Understanding	0,332	0,824	-0,150	0,392	0,321	0,351
Student Freedom	0,080	0,721	-0,414	0,086	0,023	0,046
Uncertain	-0,394	-0,418	-0,228	-0,674	-0,616	-0,499
Dissatisfied	-0,675	-0,514	-0,116	-0,730	-0,391	-0,646
Admonishing	-0,227	-0,366	0,306	-0,060	0,107	-0,104
Strict	0,434	-0,488	0,607	0,340	0,547	0,495

According to results, we conclude the following findings:

The most dominant dimensions of various teacher interaction styles (in the relation to the social climate in the classroom) are *Leadership* and *Helpful* with positive correlation and dimensions *Uncertain*, *Dissatisfied* and *Strict* with negative correlation. The most dominant dimensions of various social climates in the classroom (in the relation to the teacher interaction style) are *Teacher Support*, *Involvement*, *Rule Clarity* and *Task Orientation*. The critical values between these dimensions are presented by $\alpha = 0,01$ and $\alpha = 0,05$. For teachers, it is important to organize the work, help their students, being certain and satisfied during teaching. If teachers will be too strict, their pupils will probably more collaborate, they will know the rule and task, but they will have no feelings for teacher support and so on.

CONCLUSION

In conclusion, the results of the present research are significantly influenced not only by the sample range, but especially by the sample content. However, we believe that these findings may be beneficial not only for teachers but also for directors of secondary schools, for teaching students, who want to be professionally applied in teaching profession, for parents who encourage their children to choose secondary school and even to those to whom teaching is close and who cares who is teaching in our schools. On the other hand, the positive change in the social climate in a school class must be based on participation of both factors - teachers and their pupils in the interaction.

References

- BROK, P. D., BREKELMANS, M., WUBBELS, T. (2004). Interpersonal Teacher Behaviour and Student Outcomes. In: *School Effectiveness and School Improvement*. (pp. 407-442). Vol. 15, Nos. 3-4.
- ČAPEK, R. (2010). *Třídní klima a školní klima*. Praha: Grada.
- FENYVESIOVÁ, L., TIRPÁKOVÁ A. (2005). Komparácia interakčného štýlu učiteľov ZŠ a osemročných 8. gymnázií. In: Jandová R. (Ed.): *Příprava učitelů a aktuální proměny v základním vzdělávání*. Jihočeská univerzita v Českých Budějovicích.
- GAVORA, P. (1999). *Aki sú moji žiaci*. Bratislava: PRÁCA.
- GAVORA, P., MAREŠ, J. & DEN BROK, P. (2003). *Adaptácia Dotazníku interakčného štýlu učiteľa*. (pp. 156 – 145). In: *Pedagogická revue*, Vol. 55, n. 2.
- HUDÁKOVÁ, T. (2013). *Možnosti cvičných a uvádzajúcich učiteľov ako pomoc začínajúcim učiteľom pri ich*
- sebarealizácii a adaptovaní sa v učiteľskej profesii*. (pp. 757-763). In *Sociální pedagogika v kontextu životních etap člověka*. Brno: IMS.
- KOSTURKOVÁ, M. (2012). *Kriticky mysliaci učiteľ v roli vychovávateľa a sprievodcu žiakov pre budúcnosť*. (pp. 39-42). In: *Vychovávateľ: časopis pedagógov*, vol. 61, n. 1-2.
- LEARY, T. (1957). *Interpersonal diagnosis of personality*. New York, The Ronald Press.
- MAREŠ, J., GAVORA, P. (2004). *Interpersonální styl učitelů: teorie, diagnostika a výsledky výzkumu*. (pp. 101-128). In: *Pedagogika*, Vol. 54, n. 2.
- MLČÁK, Z. (1996). *Preferované interpersonální chování učitele*. (pp. 152-155.) In: *Pedagogika*. Vol. XLVI.

- PASTERŇÁKOVÁ, L. (2009). *Rola učiteľa v súčasnej škole*. (pp. 314-319). In: *Príprava učiteľov v procese školských reforiem*. PdF PU: Prešov.
- ZAHATŇANSKÁ, M. & MAJERNÍKOVÁ, J. (2013). *Učiteľ ako výchovný poradca*. (pp. 83-89). In: *Križovatky na cestách k učiteľstvu*. Prešov: FHPV PU.

Investigating Learning And Studying Approaches Of Students In University English Preparatory Classes

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ABSTRACT

The purpose of this study was to investigate the learning and studying approaches of students in university English preparatory classes in Turkey in terms of some variables via the use of survey method. The sample of the study was composed of 384 students out of 4975 from English preparatory schools in three reputable private universities. As the instrument of the study, Approaches to Learning and Studying Inventory (ALSI-short version) prepared by Hounsell et al. (2011) and adapted by Topkaya et al. (2011) was used. The findings obtained from ALSI revealed that there was a statistically significant difference in students' scores regarding deep, surface or strategic approaches.

INTRODUCTION

Learning approach can be defined as "... the ways in which students go about their academic tasks, thereby affecting the nature of the learning outcome" (Biggs, 1994). Research on approaches to learning derives much from the seminal work of Marton and Säljö (1976) on reading from text using phenomenographic methods, where learning is studied from the perspective of the learner, based on qualitative analysis of interview data and descriptive analyses of differences between the learning behaviors of small numbers of students. Two different levels of processing of the reading materials were identified and they were labeled as deep and surface approaches to learning. The most important aspect of the distinction between the two approaches is the intention or absence of intention to understand. According to Marton and Säljö (1976), a student with deep approach has an intention to understand and extract the meaning from the context. This student is interested in the academic task and enjoys carrying it out, searches for the meaning inside the task, tries to make it meaningful to his/her own experience and to the real world, integrates the parts of the task as a whole, sees the relationships between the task and the previous knowledge, tries to theorize about the task and form hypothesis. On the other hand, a student using surface approach sees the task as a demand to be met, or as a goal to be reached, sees the parts as discrete pieces and unrelated to each other or to other tasks, feels anxious about the time, avoids personal meanings, relies on memorization and attempts to reproduce the surface aspects of the task (Kember, 1996). Briefly, it can be stated that the concept of deep approach is associated with the intention to understand the learning material by constructing the meaning of the content. Nevertheless, the concept of surface approach is related to different forms of rote learning and the intention to learn by memorizing. This has also been reported that students' adoption of either deep or surface approach in learning is dependent on or influenced by a number of factors which can be either personal or contextual.

The following table (Table 1) compiled from the work of Entwistle (1988), Ramsden (1992) and Biggs (1999) provides some valuable characteristics of the approaches and illustrates the importance of how we manage the curriculum impacts on the learning process. To illustrate, clearly stated academic aims, opportunities to exercise some choice and well aligned assessment strategies that help students to build confidence can be found among the factors identified as encouraging a deep approach.

Table 1: Compares the characteristics and factors that encourage Deep and Surface Approaches to learning. (Compiled from Entwistle (1988), Ramsden (1992) and Biggs (1999))

	Deep Learning	Surface Learning
Definition	Examining new facts and ideas critically, and tying them into existing cognitive structures and making numerous links between ideas.	Accepting new facts and ideas uncritically and attempting to store them as isolated, unconnected items.
Characteristics	<ul style="list-style-type: none"> * Looking for meaning. * Focussing on the central argument or concepts needed to solve a problem. * Interacting actively. * Distinguishing between argument and evidence. * Making connections between different modules. * Relating new and previous knowledge. * Linking course content to real life. 	<ul style="list-style-type: none"> * Relying on rote learning. * Focussing on outwards signs and the formula needed to solve a problem. * Receiving information passively. * Failing to distinguish principles from examples. * Treating parts of modules and programmes as separate. * Not recognising new material as building on previous work. * Seeing course content simply as material to be learnt for the exam.
Encouraged by Students'	<ul style="list-style-type: none"> * Having an intrinsic curiosity in the subject. * Being determined to do well and mentally engaging when doing academic work. * Having the appropriate background knowledge for a sound foundation. * Having time to pursue interests, through good time management. * Positive experience of education leading to confidence in ability to understand and succeed. 	<ul style="list-style-type: none"> * Studying a degree for the qualification and not being interested in the subject. * Not focussing on academic areas, but emphasising others (e.g. social, sport). * Lacking background knowledge and understanding necessary to understand material. * Not enough time / too high workload. * Cynical view of education, believing that factual recall is what is required. * High anxiety.
Encouraged by Teachers'	<ul style="list-style-type: none"> * Showing personal interest in the subject. * Bringing out the structure of the subject. * Concentrating on and ensuring plenty of time for key concepts. * Confronting students' misconceptions. * Engaging students in active learning. * Using assessments that require thought, and ideas to be used together. * Relating new material to what students already know and understand. * Allowing students to make mistakes without penalty and rewarding effort. * Being consistent and fair in assessing declared intended learning outcomes, and hence establishing trust. 	<ul style="list-style-type: none"> * Conveying disinterest or even a negative attitude to the material. * Presenting material so that it can be perceived as a series of unrelated facts and ideas. * Allowing students to be passive. * Assessing for independent facts (short answer questions). * Rushing to cover too much material. * Emphasizing coverage at the expense of depth. * Creating undue anxiety or low expectations of success by discouraging statements or excessive workload. * Having a short assessment cycle.

The strategic approach to learning is also added and considered as the way in which learners approach challenging tasks and problems by choosing among tactics that they believe are best suited to the situation, and applying those tactics properly (Winne & Perry, 2005). In strategic approach the intention is to achieve the highest possible grades by using organised study methods and good time-management (Entwistle & Ramsden, 1983). This approach also involves monitoring one's study effectiveness (Entwistle, McCune & Walker, 2000) and alertness to the assessment process, aspects which are akin to metacognitive alertness and self-regulation (Vermunt, 1998; Pintrich & Garcia, 1994).

The purpose of this study was to investigate the learning and studying approaches of students in university English preparatory classes in Turkey. Thus, the curriculum was expected to be designed accordingly which, in turn, contributed to the students' achievements. Defining the learning and studying approaches of students, which was the most effective component of learning and teaching environment, and eliminating drawbacks were also attempted through this study. Increasing awareness of both students and academic staff on how to use learning and studying approaches in order to be successful was another objective in this study. Moreover, although some research has been done on students' learning approaches, there exists no principled and detailed account of the characteristics associated with learning approaches specifically in the context of language learning. The findings of this research would shed light on understanding individual differences, provide further insight into what is meant by deep, surface and strategic approaches in the specific context of language learning, and extend the understanding of students' learning approaches beyond earlier conceptualizations which were more generic.

METHODOLOGY

The setting and the participants

Learning and studying approaches of the students were investigated in terms of some variables via the use of survey method. Students at different level of proficiency that make up the target population were investigated and the proportions needed for the sample to be representative were worked out. The sample of the study contained relative percentage of students as in the target population, which was composed of 384 students out of 4975 from English preparatory schools in three reputable private universities, Izmir University of Economics in Izmir, Bilkent University in Ankara and Ozyeğin University in Istanbul. The study was conducted in 2011-2012 academic year fall term.

The instruments

The data collection instrument used in this study has two distinct parts. The first part known as the Demographical Questionnaire designed to provide information about the high schools the students graduated from, the proficiency levels (basic, independent, proficient) they study at or they repeat, and their department. The second part contains the Turkish version of Approaches to Learning and Studying Inventory (ALSI-short version) prepared by Hounsell et al. (2011) and adapted by Topkaya et al. (2011). The highest score received in each scale represented the student's level of engagement in activities intended to encourage deep, surface or strategic processing and the lowest indicated the approach that the student employed the least. In the analysis of the data, as statistical techniques, depending on the requirements of the problems of the study, multivariate analysis (MANOVA), one-way variance analysis (ANOVA) were utilized and also eta squared effect size was calculated.

FINDINGS

It can be stated that the findings obtained from ALSI indicated that there was a statistically significant difference in students' scores regarding deep, surface or strategic approach in terms of English language preparatory education taken in high school. Although there was a statistically significant difference in students' scores in surface approach [$F(1, 376) = 8.64, p < .05$], there were no statistically significant difference in students' scores in deep approach [$F(1, 376) = .501, p > .05$] and strategic approach [$F(1, 376) = .411, p > .05$]. Students who did not take any English language preparatory education in high school scored higher in surface approach compared to the ones who took English language education. Effect size eta-square of surface approach was found at low level ($\eta^2 = .024$). The scores got in deep approach was higher than the ones got in surface and strategic approaches indicating that students tended to use deep approach at university preparatory school as they used the same approach in high school. Depending on this finding, it can be stated that background knowledge, specifically strategy knowledge, played a strong role in comprehension as well as content learning. Therefore, students who learnt via deep and strategic approaches in high school tended to apply the similar approaches at university. When the links of students' personal life experiences were activated, they learnt better as links to an experience provided clarity and promoted retention of the learning.

In the second set of analyses, a statistically significant difference was noticed on each scale of the inventory depending on the proficiency level of the students. In spite of the statistically significant difference found in surface approach [$F(2, 381) = 8.21, p < .05$], no statistically significant difference was identified in deep [$F(2, 381) = .425, p > .05$] and strategic [$F(2, 381) = .300, p > .05$] approaches. Surface approach had an average level effect size eta-square ($\eta^2 = .041$). As the students at basic level scored higher compared to the ones at independent and proficient level, it can be stated that students at basic level adopted surface approach; while the ones at independent and proficient level preferred deep and strategic approaches.

The scores of the students studying the module for the first time and the scores of those repeating the module displayed a statistically significant difference as well. Students' scores on surface approach [$F(1, 382) = 6.80, p < .05$] showed a statistically significant difference; on the other hand, there were no statistically significant difference in deep [$F(1, 382) = 1.81, p > .05$] and strategic [$F(1, 382) = .159, p > .05$] approaches. It was also revealed that it had low rate effect size eta-square ($\eta^2 = .018$). What can be inferred from this data is that students repeating the module learnt and studied through surface approach. It can also be synthesized that high achievers knew exactly what they needed to accomplish, thus, before they started studying they set academic goals.

In contrast, with respect to LYS (University Entrance Exam), there was no statistically significant difference in students' surface [$F(3, 380) = 1.85, p > .05$], deep [$F(3, 380) = 2.76, p < .05$] and strategic [$F(3, 380) = 1.16, p > .05$] approach scores. It can be stated that as exams only test the inadequate view of thinking held by most academic institutions so analysis, judgement and stating arguments are not tested. Unfortunately, this leads students to memorize and apply strategic approach.

DISCUSSION AND CONCLUSION

Research on student learning at university can be very useful for improving university teaching and learning. The distinction among deep, surface and strategic approaches to learning is particularly useful for teachers who would like to understand their students' learning and create learning environments which encourage students to achieve desired learning outcomes. How students approach a learning task will strongly influence the quality of their learning outcomes. As surface approach leads generally to low retention and an inability to use information in new contexts, and deep and strategic approaches, when adopted together, to a better understanding, the implication is clear. Good teaching should encourage a deep approach, when used together with a strategic approach at the expense of a surface approach. Students' approaches can be influenced by the way teachers design subjects and courses, particularly the assessment. In order to encourage students to use deep approach teachers can give students opportunities to discuss, debate and compare their understandings with each other and with the teaching staff. Students can also be provided with opportunities to gain qualitative feedback, especially but not only on their assessed work, rather than just giving marks or grades.

Based on the findings of the study and the related literature review, the following suggestions can be offered, as the learning activities are planned according to the needs and learning approaches of the students, a questionnaire should be administered at the beginning of each academic year to collect data about the students' learning and studying approaches as well as informing them about their own approach. Moreover, it is generally accepted that a heavy loaded English language curriculum and overemphasizing the grades and examinations may lead students focus on rote memorization just to meet the expectations. To develop meaningful approaches while learning English, the nature of examinations both in the schools and nationwide, should be shifted from a

knowledge-based to a more performance-based type. Rather than assessing only knowledge-based and lower levels of learning in the examinations, higher order thinking skills and performance of the learners should be evaluated. In order to use the newly-learned language items or skills, extra-curricular activities should be designed for the students to utilize these in an authentic environment. Besides, teachers should be informed about the meaning and importance of learning and studying approaches. Teachers, educators, researchers, and policy makers may collaborate for this purpose organizing small workshops and meetings as a part of their in-service trainings. Teachers should plan in such a way that students are able to have divergent type of classroom activities. Finally, learning and studying approaches courses which is a vital element of learning and teaching environment should be integrated into the faculty of education curriculum. By adopting these ways, substantial contributions to our understanding of the students' learning approaches can be made.

References

- Biggs, J. (1994). Approaches to learning: Nature and measurement of. In Husen, T. & Postlethwaite T. N. (Eds.) *The international encyclopedia of education*, vol. 1, pp. 319- 322. Oxford: Pergamon.
- Biggs, J. B. (1999). *Teaching for quality learning at university: What the student does*. Buckingham: Open University Press.
- Entwistle, N.J. (1988). Improving teaching through research on student learning. In Forest, J.J.F. (Ed.), *University teaching: International perspectives*, Garland, New York (1998), pp. 73–112
- Entwistle, N. J., McCune, V. & Walker, P. (2000). Conceptions, styles and approaches within higher education: analytic abstractions and everyday experience. In R. J. Sternberg & L-F. Zhang (Eds.), *Perspectives on Cognitive, Learning, and Thinking Styles*. Mahwah, N. J.: Lawrence Erlbaum (in press).
- Entwistle, N.J., & Ramsden, P. (1983). *Understanding Student Learning*. London: Croom Helm.
- Kember, D. (1996). *The intention to both memorise and understand: Another approach to learning?* Higher Education, 31, 341–351.
- Marton, F., & Säljö, R. (1976). *On qualitative differences in learning: I - Outcome and process*. British Journal of Educational Psychology, 46(1), 4-11.
- Pintrich, P. R. & Garcia, T. (1994). Self-regulated learning in college students: knowledge, strategies and motivation. In P. R. Pintrich, D. R. Brown & C-E Weinstein (Eds.), *Student Motivation Cognition and Learning*. (pp. 113-134). Hillsdale, N.J.: Lawrence Erlbaum.
- Ramsden, P. (1992). *Learning to teach in higher education*, Routledge.
- Saunders, G. L. (1998). *Relationships among epistemological beliefs, implementation of instruction, and approaches to learning in college chemistry*. (Doctoral dissertation, University of Oklahoma Graduate College, Norman, Oklahoma).
- Topkaya, N., Yaka, B. & Öğretmen, T. (2011). *Öğrenme ve ders çalışma envanteri'nin uyarlanması ve ilgili yapılarla ilişkisinin incelenmesi* [The adaptation study of learning and studying approaches inventory and the relations with related constructs]. Education and Science, 36, 159, pp. 192-204.
- Vermunt, J. (1998). The regulation of constructive learning processes. *British Journal of Educational Psychology*, 68, 149-171.
- Winne, P.H., & Perry, N. E. (2005). Measuring self-regulated learning. In M. Boekaerts, P.R. Pintrich, & M. Zeidner (Eds.), *Handbook of self – regulation*. San Diego, CA: Academic Press, 532-568.

Investigation Of High School Teachers' Attitude Against Computer Aided Education With Some Variables: A Case Study In Denizli

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ABSTRACT

Aim of this study is to detect high school teachers' attitudes towards computer based instruction (CBI) through statistical analysis of the relationships between various variables (age, gender, seniority, major, receiving education about computer use within FATİH project, ability to use a computer) survey method was used in this research. In order to achieve this aim, 'attitude scale toward Computer-Based Instruction', which was developed by Arslan (2006) was applied to 160 high school teachers in Denizli. Data were analyzed through SPSS 16 program. At the end of the research, it was found that there is a statistically significant difference between attitudes towards CBI depending on gender and ability to use computer.

Keywords: Computer, teacher, Computer-Based Instruction (CBI)

INTRODUCTION

As it is in every aspect of life, technology in education is developing rapidly, and it is argued how to provide education better with new approaches and new developments. It wouldn't be wrong to mention that teachers have the biggest responsibility for this. Through making use of CBI, it is aimed to increase students' motivation, timesaving, increase quality, effectiveness and flexible learning in education. According to Hannafin and Peck (1989), Computer- Based Instruction (CBI) is defined as transferring content and activities of the course by using computers. While Demirel et.al. (2011) defines CBI as using computers in line with school administration in courses, Şahin and Yıldırım (1999) defines CBI as a teaching method, which increases students' motivation in teaching process, enables students autonomous learning. CBI can be viewed as activities that are prepared for a specific field in which it provides an environment that students are active, and teachers are guides.

Presley and Skinner's studies in 1950's are the first studies related CBI. In that period, since principles of behaviorist theory were popular, individual learner differences were neglected. In 1960's, in the name of personalized education and computer based education, punched cards were developed. Thanks to rapid developments in 1970's, teachers started to make use of computers in their courses. In 1980's first personal computers were produced. When computer based teaching applications were applied, they were designed as systems in which students could individually study, assess their learnings, and get feedback. However, with the spread of constructivist approach, computers have been used widely with software programs that were developed for qualified teaching purposes (Tanyeri, 2007).

In these days, it is common that computers are used in different fields of education. For instance, we can see computers as an application tool that students make use of while learning and finding answers to questions or students become teachers and computers become students for providing students' with learning applications. Need for use of computers in education is increased, due to the fact that number of students are rising, there are not enough teachers, and there is not enough time, individual capabilities and differences become important (Alkan, 1998, Yanpar, 2006).

Nowadays, computers, that provide teachers with sources of teaching materials and supports education, plays an important role in education. This situation covers only one of the most important contributions that CBI makes to education. It should not be forgotten that through using computers, the student practices the ability of applications and research and explore the teaching side of the computer in this period.

In general, CBI is used to present the information in teaching and learning process, make students practice, and guide them appropriately. It should be recognized that in order to make this process efficient, teachers should have enough background knowledge and they should be at the level of transfer their knowledge.

When the literature is analyzed, in the studies related to investigate teachers' and preservice teachers' attitudes towards CBI (Çelik and Bindak, 2005; Yenilmez and Ersoy, 2008; Şahin and Akçay, 2011), it is concluded that teachers and students made positive comments on using computers in education, and they have positive attitudes towards CBI. In addition, Tay and Yıldırım (2013) carried a research in social sciences pre-service teachers, and they found that there are significantly positive differences in recalling information, interest in courses, permanent

knowledge, while there were no statistically significant differences based on gender. In addition, it was also observed that teaching with the help of computer simulations provides help to solve problems of teaching three dimensional content traditionally (Çekbaş et. al., 2003). In a study carried with elementary school math pre-service teachers, while there were significant differences between their attitudes towards computers and computer based courses depending on their frequency of using computers, there were positive and meaningful results towards applying CBI in the classroom (Özgen, et.al., 2009). in Yenilmez's (2009) research on math pre-service teachers, it was found that male teachers were statistically more interested in computers than female teachers. In addition, Kocasaraç (2003) has another research study that indicates that male teachers involve computers in their teaching more.

There is an ample gap in recent years on in-service high school teachers' CBI applications. Most of the studies existing in this field are conducted with elementary school teachers and pre-service teachers. In our country, it is important to investigate existing research due to the fact that teachers are expected to make use of technology in their classes since technological infrastructure of the elementary schools are improved within FATİH project (meb.gov.tr, 2012) that stands for Movement of Enhancing Opportunities and Improving Technology that is conducted by Ministry of Education and supported by Ministry of Transport and Maritime Affairs and Communications

In this respect, this research is aimed to investigate developments in technological infrastructure of schools within FATİH project, and attitudes of in-service teachers towards CBI, instead of pre-service teachers' attitudes. Attitudes of the sample group was investigated to detect whether there are any significant differences between teachers' towards CBI in terms of various variables (school type, age, gender, seniority, major, and whether or not they received any computer education within FATİH project).

So, this research aimed to investigate to answer "What are the variables that effect attitudes of high school teachers in central Denizli towards CBI?" as main research question.

Research Questions

1. Is there any difference between high school teachers' attitudes towards CBI depending on the institutions they work in?
2. Is there and difference between high school teachers' attitudes toward CBI depending on gender?
3. Is there and difference between high school teachers' attitudes toward CBI depending on age?
4. Is there and difference between high school teachers' attitudes toward CBI depending on their seniority?
5. Is there and difference between high school teachers' attitudes toward CBI depending on their major?
6. Is there and difference between high school teachers' attitudes towards CBI depending on receiving education in computer use within FATİH project?
7. Is there and difference between high school teachers' attitudes toward CBI depending on the ability to use computer?

METHOD

This research conducted as survey method. Generally, survey methods are organizations within a population composed of multiple elements, or a sample group extracted from the population, in order to make a general interpretation about the universe (Karasar, 2005). In this research, teachers' attitudes towards CBI were analyzed.

Population and Sample

The population under investigation included all high school teachers in Denizli. Sample of the population was chosen from high schools that represent different demographic structures of Denizli. Sample, which represents the population was composed of teachers from different major, were selected from nine different high schools (5 Anatolian high schools, 2 vocational high schools, 2 private high schools). Presented research is limited to these groups. Demographic data of the participants are resented in Table 1.

Table 1. Demographic information of participants

Variable	Category	n	%
Gender	Female	91	56,9
	Male	69	43.1
High school	Anatolian high school	87	54.4
	Vocational high school	49	30.6
	Private high schools	24	15
Total		160	100

Data Collection

A questionnaire was used as data collection tool, which is composed of two sections, in this research. In the first section, data, which were gathered by the researcher, related to high school types, seniorities, age, gender, and whether they received any education about computer use within FATİH Project, and their abilities of using computer were analyzed. In the second section, CBI attitude scale, which was developed by Arslan (2006), was applied.

Data Collection Tool

Likert- type Attitude scale that was used in the research was developed by Arslan (2006), was one-dimensional, composed of 10 affirmative, 10 negative items. Kaiser-Meyer-Olkin (KMO) co-efficient of the scale was 0.88, Barlett test meaningfulness value was 0.000. and Cronbach-alpha internal consistency co-efficient was 0.93 (Arslan, 2006). Items were organized in five points: ‘Strongly Agree’, ‘Agree’, ‘Neutral’, ‘Disagree’, ‘Strongly Disagree’. In affirmative items, the pointes were determined as such: 1 ‘Strongly Disagree’, 2 ‘Disagree’, 3 ‘neutral’, 4 ‘Agree’, and 5 ‘Strongly Agree’. In negative items, the points were determined as such: 1 ‘Strongly Agree’, 2 ‘Agree’, 3 ‘Neutral’, 4 ‘Disagree’, 5 ‘Strongly Disagree’. Internet consistency co-efficient of this research was 0.91.

Data Analysis

Kolmogorov-Smirnov test was applied to detect whether the items of the Attitude Scale of CBI, which is used as a dependent variable in this research, show normal distribution or not. According to K-S(z) analysis, it was identified that answers for Computer-Based Instruction CBI showed normal distribution (K-S(z)=1.01; $p>0.05$). Thus, t-test and one way variance test, which are parametric statistical tests), were used to answer research questions.

FINDINGS

Findings were presented in categories of research questions.

Do teachers’ attitudes towards CBI differ depending on the schools they work in?

In order to answer this research question, One Way Anova Test, which is a parametric technique, was used.

Table 2. Analysis of teachers’ attitudes towards CBI based on the schools they work in

Variable	Category	n	\bar{X}	ss	F	p
Schools	Anatolian high school	87	3.80	0.58	1.092	0.338*
	Vocational High school	49	3.64	0.62		
	Private High schools	24	3.71	0.72		
	Total	160				

* $p=0.338>0.05$

As a result of one way variance analysis, there were no statistically significant differences in attitudes of teachers towards CBI depending on the schools they work in. When Table 2. is analyzed, it can be seen that teachers’ attitudes towards CBI were similar, varying between 3.64-3.80. when they are classified based on their schools: Anatolian high schools, Vocational High schools, and Private high schools

Is there any difference between high school teachers’ attitudes toward CBI depending on gender?

Independent Samples T Test, which is a parametric technique, was used in order to answer the research question.

Table 3. Analysis of attitudes towards CBI based on gender

Variable	Category	n	\bar{X}	ss	t	p
Gender	Female	91	3.63	0.62	-2.389	0.011*
	Male	69	3.88	0.58		

* $p=0.011<0.05$

A statistically significant difference was found as a result of the analysis based on gender in 0.5 level ($t=-2.57$, $p<0.05$). When Table 3. is analyzed in order to detect which gender has advantage, it was detected that means of male teachers’ attitudes towards CBI ($\bar{X}_M= 3.88$), are higher than female teachers’ attitudes ($\bar{X}_F= 3.63$). Considering this result, it can be said that male teachers have higher attitudes that female teachers towards CBI.

Is there any difference between attitudes of high school teachers' based on age?

One Way Anova test, which is a parametrical technique, was applied in order to answer the research question.

Table 4. Analysis of high school teachers' attitudes towards CBI based on age

Variable	Category	n	\bar{X}	ss	F	p
Age	24-29	13	3.62	0.71	1.304	0.265*
	30-35	28	3.95	0.49		
	36-41	62	3.72	0.63		
	42-47	28	3.80	0.59		
	48-53	23	3.55	0.68		
	54-60	6	3.61	0.48		

*p=0.265>0.05

As a result of one way analysis, it was seen that there were no statistically significant differences in attitudes of high school teachers towards CBI based on age. Attitudes towards CBI of the participants from different age groups were similar to each other. In other words, as age ranges differ, attitudes towards CBI become similar.

Is there any difference between high school teachers' attitudes toward CBI depending on their seniority?

One way Anova test was applied to answer the research question.

Table 5. Analysis of high school teachers' attitudes towards CBI based on seniority years

Variable	Category	n	\bar{X}	ss	F	p
Seniority	1-5 years	16	3.70	0.69	0.73	0.601*
	6-10 years	15	3.90	0.45		
	11-15 years	57	3.77	0.63		
	16-20 years	31	3.78	0.60		
	21-25 years	25	3.56	0.66		
	26 years and above	16	3.67	0.61		

*p= 0.601> 0.05

Results of one way analysis indicate that there is not a statistically significant difference between attitudes of high school teachers towards CBI. When Table 5. was analyzed, it was seen that as teachers' seniority years differ, their attitudes towards CBI become similar. In other words, as teachers' seniority years change, their attitudes towards CBI are similar in 3.56- 3.90 level, out of five.

Is there any difference between high school teachers' attitudes toward CBI depending on their major?

One Way Anova Test, which is a parametric technique, was applied in order to answer the research question.

Table 6. Analysis of teachers' attitudes towards CBI based on their majors.

Variable	Category	n	\bar{X}	ss	F	p
Major	Math	35	3.72	0.79	0.30	0.825*
	Science	41	3.67	0.65		
	Social sciences	59	3.78	0.52		
	Other	25	3.77	0.52		

*p= 0.825> 0.05

Result of the one way analysis indicate that there were no a statistically significant differences in teachers' attitudes towards CBI based on their major. When Table 6. was analyzed, it was seen that attitudes of teachers from different braches were similar since their scores were above average. In other words, attitudes of teachers' from different major towards CBI were similar.

Is there any difference between high school teachers' attitudes towards CBI depending on receiving education in computer use within FATİH project?

Independent Sample T-Test, which is a parametric technique, was used in order to answer the research question.

Table 7. Analysis of high school teachers' attitudes towards CBI based on their computer education within FATİH Project

Variable	Category	n	\bar{X}	ss	t	p
Receiving computer education within FATİH project	Participants who received education	119	3.76	0.59	0.626	0.53*
	Participants who did not receive education	41	3.69	0.69		

* $p=0.53>0.05$

Results of the Independent Sample T-test indicated that there were not a statistically significant differences between scores based on their computer education within FATİH Project ($t=0.626$, $p>0.05$). When Table7. was analyzed, it was also seen that there is a similarity in teachers' attitudes towards CBI. Although great majority of teachers received education of computer use, their attitudes showed no statistically significant difference towards CBI.

Is there any difference between high school teachers' attitudes toward CBI depending on the ability to use computer?

One Way Anova test, which is a parametric technique, was used in order to answer the research question.

Table 8. Analysis of high school teachers' attitudes towards CBI based on their abilities to use a computer

Variable	Category	n	\bar{X}	ss	F	p
Ability to use computer	Very bad	3	2.87	0.75	7.697	0.000*
	Bad	14	3.56	0.73		
	Average	56	3.51	0.65		
	Good	70	3.90	0.51		
	Very good	17	4.12	0.55		
Total		160				

* $p=0.000<0.01$

Results of the one way variance analysis indicated that there is a statistically significant difference between high school teachers' attitudes towards CBI depending on their abilities to use a computer. In order to detect which group have positive attitude, Levene Test was used and it was seen that the variances were equal ($L=0.741$; $p>0.05$). Thus, a Post hoc test developed by Duncan for the cases when variations are equal, was applied. According to the data obtained, it was detected that teachers with higher ability to use computers have higher mean of attitude scores (\bar{X} very good= 4.12) than other groups. According to Post hoc test developed by Duncan, it was determined that teachers with 'very good' and 'good' levels of computer use have higher mean scores of attitudes towards CBI than teachers with 'very bad' and 'average' levels of computer use.

CONCLUSION AND DISCUSSION

In general, teachers' attitudes towards CBI are high. In this respect, it can be concluded that they have positive attitudes towards involving computers in their courses. There were no statistically significant differences between teachers' attitudes based on the schools they work in. Thus, it can be said that teachers have positive attitude using CBI in class regardless of the schools they work in.

There is no difference between teachers' attitudes as their ages change. Since CBI has been detected to have positive effects on student and teacher motivations from the beginning of 2000's (Çekbaş et.al. 2003; Kocasaraç, 2003; Çelik and Bindak, 2005; Yenilmez and Ersoy, 2008; Özgen, et.al. 2009, Yenilmez, 2009; Şahin and Akçay, 2011; Tay and Yıldırım, 2013), not having any difference based on age in these days can be normal.

In light of the data obtained related to teachers' attitudes towards CBI based on gender, it was seen that attitudes of male teachers are more positive than attitudes of female teacher. Although Tay and Yıldırım (2009) did not find any gender-related difference between teachers' attitudes towards CBI, Yıldırım (2009) detected that male pre-service teachers have more positive attitudes towards use of CBI in math classes. Results of the study, which was conducted by Kocasaraç (2003), also showed that male teachers' attitudes were higher than females. As a result, it can be said that female teacher have lower attitudes towards CBI. Identifying possible reasons of this situation will play an important role in increasing the awareness of taking precautions.

Research findings showed that teachers with the ability to use a computer have increased positive attitudes towards CBI. As Aypay and Odabaşı (2008) proposed, as teachers' ability to use a computer gets better, they are more likely to integrate computers in their teaching.

To sum up, findings of the present research indicate that teachers have high attitudes towards CBI, their attitudes remain the same regardless of school and seniority, while male teachers have more positive attitudes than female teachers, and teachers with good computer skills have more positive attitudes compared to the ones with bad computer skills. This study provides a clue that researches (Tay and Yıldırım, 2013; Yenilmez, 2009), which are related with pre-service teachers, can be generalized to in-service teachers.

On the other hand, this research did not aim to investigate teachers' attitudes towards CBI in terms of their perceptions about CBI, that is they assess the CBI as constructivist or behaviorist theories. Thus, a further study should focus on this aspect, since it is important to guide teachers in light of constructivist theory (Tanyeri, 2007), in which CBI is important for cognitive development of students, in these days that technological infrastructure of our schools are being developed.

References

- Alkan, C. (1998). *Eğitim Teknolojisi*, Ankara: Anı Yayıncılık
- Arslan, A. (2006). Bilgisayar Destekli Eğitim Yapmaya İlişkin Tutum Ölçeği. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 3 (2), 24-33.
- Aypay, A., Özbaşı, D., (2008). Öğretmenlerin Bilgisayara Karşı Tutumlarının İncelenmesi. *Kuram ve Uygulamada Eğitim Yönetimi*. Yaz, Sayı 55, 339-362
- Çekbaş, Y., Yakar, H., Yıldırım, B., Savran, A.(2003), Bilgisayar Destekli Eğitimin Öğrenciler Üzerine Etkisi. *The Turkish Online Journal of Educational Technology – TOJET* October, 2 (4) Article 11.
- Çelik H, C. and Bindak, R. (2005). İlköğretim Okullarında Görev Yapan Öğretmenlerin Bilgisayara Yönelik Tutumlarının Çeşitli Değişkenlere Göre İncelenmesi. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*, 6 (10), 27-38.
- Demirel, Ö., Seferoğlu S., Yağcı E. (2001). *Öğretim Teknolojileri ve Materyal Geliştirme*. Ankara: Pegem A Yayıncılık.
- Hannafin, M.J.-Peck, K.L. (1989). *The Design, Development and Evaluation of Instructional Software*. New York/London.
- http://mebk12.meb.gov.tr/meb_iys_dosyalar/19/02/317488
- Karasar, N. (2005). *Bilimsel Araştırma Yöntemi*. (14th Editon). Ankara: Nobel Yayın Dağıtım.
- Kocasarıç, H. (2003). Bilgisayarın Öğretim Alanında Kullanımına İlişkin Öğretmen Yeterlilikleri. *The Turkish Online of Educational Technology – TOJET* July ISSN:1303-6521 volume 2 Issue 3.
- Özgen, K., Obay, M., Bindak, R.(2009). Ortaöğretim Matematik Öğretmen Adaylarının Bilgisayar Destekli Eğitime Yönelik Tutumlarının İncelenmesi. *T.C. Dicle Üniversitesi Sosyal Bilimler Enstitüsü Dergisi (DÜSBED)*.ISSN : 1308-6219 Kasım 2009 Cilt-1 S.2
- Şahin, A. and Akçay, A. (2011). Türkçe Öğretmeni Adaylarının Bilgisayar Destekli Eğitime İlişkin Tutumlarının İncelenmesi. *International Periodical For The Languages, Literature and History of Turkish or Turkic* Volume 6/2 Spring 2011, p. 909-918, TURKEY
- Şahin, T. and Yıldırım, S. (1999). *Öğretim Teknolojisi ve Materyal Geliştirme*. Ankara: Anı Yayıncılık.
- Tanyeri, T. (2007). *Bilgisayar Destekli Öğretim İle İlgili Temel Kavramlar, Öğeleri, Kuramsal Temelleri Ve Uygulama Yöntemleri. Bilgisayar I-II, Temel Bilgisayar Becerileri* (Editör: A. Güneş). Pegem A Yayıncılık, Ankara.
- Tay, B., Yıldırım, K. (2013). Bilgisayar Destekli Öğretimin Hayat Bilgisi Öğretimi Dersinde Başarıya Etkisi ve Yönteme İlişkin Öğretmen Adaylarının Görüşleri. *Uşak Üniversitesi Sosyal Bilimler Dergisi*, Kış (6/1).
- Yenilmez, K. and Ersoy, M. (2008). Matematik Öğretmeni Adaylarının Bilgisayar Destekli Eğitim Yapmaya Yönelik Tutumları. *Proceedings of 8th International Educational Technology Conference*, 600-603.
- Yenilmez, K. (2009). Öğretmen Adaylarının Bilgisayar Destekli Matematik Öğretimi Dersine Yönelik Görüşleri. *Sosyal Bilimler Dergisi* Sayı: 21.

Investigation Of The Effects Of Educational Internet Use Self-Efficacy Beliefs And Self-Regulated Learning Skills Over Information Literacy

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ABSTRACT

With this study, aims the investigation of the effects of educational internet use self-efficacy beliefs and self-regulated learning skills over information literacy. This research is designed as relational scanning model. In the study, 3 scales are used as tool of data collection: “Educational Internet Use Self-efficacy Beliefs (EIUSB) Scale” developed by Şahin (2009) “Self-regulating Learning Skills (SRLS) Scale” developed by Turan (2009) and “Information Literacy (IL) Scale” developed by Adıgüzel (2011). The sample of this study is formed by 355 senior students from departments of Chemistry, Electrical-Electronics, Computer, Environmental, Geology, Mining, Mechanical Engineering and Chemical department from the Faculty of Engineering. In order to analyze the data, SPSS 16.00, Pearson correlation coefficient techniques, regression analysis techniques are used. At the end of the study, between all scales has a positive relation. Multiple linear regression analysis showed that Educational Internet Use Self-efficacy Beliefs and Self-regulating Learning Skills scales has been found to be effective on Information Literacy.

Keywords: Educational Internet Use Self-Efficacy Beliefs, Information Literacy, Self-Regulated Learning Literacy, Engineering Students, Regression Analysis

INTRODUCTION

In order to be successful in this information age we live in, it is essential to be a good information consumer, to have the skills to find and use information, in other words, to have information literacy skills. Information literacy is defined as the ability to have access to information and to use it, which is corner stone of life-long learning (Kurbanoğlu & Akkoyunlu, 2002). Constantly increasing information and in parallel with this, the fact that, what people learn loses its validity within a short time, require people to be lifelong learning individuals (Polat, 2005).

Information literacy refers to full capabilities the individual displays from the process of finding information to putting it into use (Kızılaslan, 2007). Depending on the definition of UNESCO, information literacy is expressed as "self-recognition of information requirements by the individual, definition and evaluation of quality of the information accessed, access to information and its storage, effective and ethical usage of information as well as the capacity for adaptation of the previous information to a new situation" (Hennessey, 2009). Characteristics of the information literate individual is expressed differently in various resources. Information literate individuals can find the information they need, access this information, use it effectively, restructure it and use technology effectively while doing so. Also Information literates have skills such as; critical-thinking, analysis, synthesis and the ability for co-operation with others. Information literate is the person who has learnt how to learn, how to structure information, how to find and how to use it. Such an individual is a lifelong learner as, in a new situation, this individual can find any information necessary to solve a new problem (ALA,1989;trsf.Polat,2006).

The Internet and other related instructional technologies are extremely important for individuals to reach the information they need through reliable sources. Today, individuals are faced with a wide variety of information and an abundance of information in any field. Computer and internet technology have made the realization of these processes considerably easy and shortened the process of information collection, storage, re-structuring, multiplying places, and distribution by creating the necessary infrastructure (Koç & Koşaner, 2005). Self-competence belief here is about an individual's adequacies in fulfilling a task or work. High level of self-competence belief, is an effective that increases the interest in an activity or a career (Bandura, 1997). Self-competence belief, is a significant precursor of result expectation and interest (Compeau, Higgins & Huff, 1999).

Today, within the context of information literacy, success of individuals in their educational life depend on their competence in the following issues; Besides using the library for information access, they must be able to use web research tools effectively, evaluate accessed information both in terms of quality and relevance and use information to answer research questions (Kinikin & Hench, 2012). An information literate individual must recognize right and adequate information as the basis of making logical decision, recognize information requirements, formulate questions based on information requirements, identify possible information resources, develop successful research strategies, access to information resources including computer based and other technologies, evaluate information, organize information for practical use, combine present information with new information, and use information for critical thinking and problem solving (Doyle, 1994).

In order to do these operations, it is necessary for the individual to have the effort to control and manage complex learning activities in other words, to have self-regulation skills (Kauffman, 2004). Self-regulated learning, is a self-controlled process, where students transform their mental academic skills to task-oriented skills (Zimmerman, 2001). In this process, self-regulated learners are individuals who can control their learning experience in different ways, organize knowledge and recall it, and recognize the factors that affect their learning by having a positive attitude towards their own skills (Schunk, 1994; Artino & Stephens, 2006).

In the light of all these, in this study, as they need to use information actively and contemporarily, the effects of candidate engineers' self-competence in using the internet to access information, and the effects of self-regulated learning skills at accessing to the knowledge and evaluating it, on their information literacy levels are studied.

OBJECTIVE OF THE RESEARCH

With this study, aims the investigation of the effects of educational internet use self-efficacy beliefs and self-regulated learning skills over information literacy.

SUB PROBLEMS

1. Is there a connection between information literacy levels, educational internet use self-efficacy beliefs levels and self-regulated learning skills of students?
2. Are there the effects of together educational internet use self-efficacy beliefs and self-regulated learning skills over information literacy of students?
3. Are there the separately effects of educational internet use self-efficacy beliefs and self-regulated learning skills over information literacy of students?
4. Does the effects of students' educational internet use self-efficacy beliefs and self-regulated learning skills on information literacy levels vary according to gender?

METHOD OF THE RESEARCH

In this study, quantitative research method and relational screening model has been used.

Model of the Research: Research model is relational screening. In accordance with this model the existence and the level of the relation between dependent and independent variables were attempted to be displayed (Crano & Brewer, 2002).

Sample of the Research: The sample of this study is formed by 355 senior students from departments of Chemistry, Electrical-Electronics, Computer, Environmental, Geology, Mining, Mechanical Engineering and Chemical department from the Faculty of Engineering. 38 of Students (10.7%) are from the department of Chemistry Engineering, 52 of them (14.6%) are from the department of Electrical-Electronics Engineering, 72 of them (20.3%) are from the department of Computer Engineering, 38 of them (10.7%) are from the department of Environmental Engineering, 30 of them (8.5%) are from the department of Geology Engineering, 33 of them (9.3%) are from the department of Mining Engineering, 36 of them (10.1%) are from the department of Mechanical Engineering, 56 of them (15.8%) are from the department of Chemistry, 158 of students (44.5%) are female and 197 of them (55.5%) are male.

DATA COLLECTION INSTRUMENTS

For research a three fold form has been created. In the first part includes "Educational internet use self-efficacy beliefs (EIUSB)" scale developed by Şahin (2009). In the second part "Self-regulating Learning skills (SRLS) Scale", developed by Turan (2009) for define learning skills of students. Third part includes "Information Literacy Scale (ILS)" developed by Adıgüzel (2011) in order to determine gain and configuring information skills.

Educational Internet Use Self-efficacy Beliefs (EIUSB) Scale developed by Şahin (2009) consists of 28 items. As a result of the factor analysis made during the development of the scale, it has been stated that the scale is collected under one factor. The scale is prepared as five-point Likert type scale and the levels are shown as: Completely Competent=5, Quite Competent =4, Competent=3, Moderately Competent=2, Not Competent=1. The highest score to get from the scale is 140 and the lowest level is 28. The high scores show that the students see themselves competent in internet use for educational purposes and the low scores show that the students consider themselves inadequate in internet use for educational purposes. The Cronbach Alpha is applied to identify the internal consistency of the scale and the coefficient is found as .96 ($p < .001$).

In the study; Self-regulating Learning skills (SRLS) Scale, developed by Turan (2009) to determine university students' self regulated learning skills was used as the data collection tool. The response range of the scale is from "definitely disagree" (1), "disagree" (2), "uncertain" (3), "agree" (4) to "completely agree" (5). The minimum and the maximum score that can be taken from the scale are between 41-205. Five-point Likert type scale includes 41 items and four subscales named motivation and action to learning (7 items), planning and determining aims (8 items), strategy using and assessment (19 items), and lack of self-directedness (7 items). These subscales are in harmony with the theoretical framework of the study. Cronbach's alpha reliability coefficients for the scale and four subscales were 0.91 and 0.88, 0.91, 0.83, 0.76 respectively.

Information Literacy (IL) Scale developed by Adıgüzel (2011) is a five-point Likert type scale and is composed of 29 questions. The scale consists of the 4 sub-dimensions of "Defining Information Needs" (8 items), "Access to Information" (11 items), "Use of Information" (5 items), and "Ethical and Legal Settings in Use of Information" (5 items). As Information Literacy Scale aims at the determining the frequency in teacher candidates' information acquisition skills, the scale was designed as; always, often, sometimes, rarely and never. The reliability coefficient of the scale was calculated as .92, whereas it was calculated as .955 in this research. The highest possible score was 145 while the lowest possible score was 29.

EVALUATION OF THE DATA

In this research, whether the data obtained displays normal distribution or not is understood by looking at Kolmogorov-Smirnov and Shapiro Wilk tests. When the number of data is less than 29, Shapiro Wilk test is used and when the number of data is over 29 or larger, Kolmogorov-Smirnov (Lilliefors) test is used (Kalaycı, 2010). order to determine whether the data displays normal distribution or not, "One Group Kolmogorov- Smirnov Test" test has been applied separately to the data collected by the three scales. The values attained are; the "Information literacy (IL) scale" ($Z=1.36$, $p > .05$), "Educational Internet Use Self-efficacy Beliefs (EIUSB) Scale" ($Z=0.895$, $p > .05$) and "Self-regulating Learning skills (SRLS) Scale" ($Z=0.958$, $p > .05$). All collected data have normal distribution with regards to all variables. SPSS 16.00 is used to analyze the data. PEARSON correlation coefficient analysis technique and Linear Regression Analysis are applied in order to observe the relations between scales.

FINDINGS

The research findings are evaluated in the context of sub-problems.

Sub-Problem 1. Is there a connection between information literacy levels, educational internet use self-efficacy beliefs levels and self-regulated learning skills of students?

As a result of Pearson Multiplication Momentum Correlation Analysis, conducted to define the relations between the SRLS scale and IL scale and factors; IL scale and factor scores and SRLS scale score, Motivation and action to learning factor, Planning and determining aims factor, Strategy using and assessment factor scores have a significant positive relation ($p < .01$) (Table 1).

Table 1. Pearson Multiplication Momentum Correlation Analysis Results conducted to define relations of the SRLS scale, IL scale.

		IL Scale and Factors				IL Scale
		Defining Information Needs	Access to Information	Use of Information	Ethical and Legal Settings in Use of Information	
SRLS and Factors	Motivation and action to learning	$r=.526(**)$	$r=.529(**)$	$r=.507(**)$	$r=.448(**)$	$r=.557(**)$
	Planning and determining aims	$r=.519(**)$	$r=.561(**)$	$r=.564(**)$	$r=.488(**)$	$r=.587(**)$
	Strategy using and assessment	$r=.584(**)$	$r=.633(**)$	$r=.563(**)$	$r=.509(**)$	$r=.639(**)$
	Lack of self-directedness	$r=.000$	$r=-.026$	$r=.064$	$r=.028$	$r=.008$
	SRLS Total	$r=.596(**)$	$r=.628(**)$	$r=.613(**)$	$r=.536(**)$	$r=.656(**)$

Table 2. Pearson Multiplication Momentum Correlation Analysis Results conducted to define relations of the EIUSB scale and IL scale and factors.

	IL Scale and Factors				IL Scale
	Defining Information Needs	Access to Information	Use of Information	Ethical and Legal Settings in Use of Information	
EIUSB Scale	$r=.550(**)$	$r=.550(**)$	$r=.454(**)$	$r=.361(**)$	$r=.544(**)$

As a result of Pearson Multiplication Momentum Correlation Analysis, conducted to define the relations between the IL scale and Factors and EIUSB scale; IL scale and Factors and EIUSB scale have a significant positive relation ($p<.01$) (Table 2).

Sub-Problem 2. Are there the effects of together educational internet use self-efficacy beliefs and self-regulated learning skills over information literacy of students?

In the third sub-problem of the research, prediction power of students' internet use self-efficacy and self-regulatory learning skills and factors on their information literacy levels were studied. In order to find an answer to this problem, prediction level of self-efficacy and self-regulated learning skills to information literacy was analyzed by multiple prediction analysis and the results were given in Table 3.

Table 3. Multiple Linear Regression Analysis Results relating to predict information literacy of together educational internet use and Self-regulating Learning skills

Variables	B	Std Error	Standardized Coefficients β	t
Constant	1.538	5.656		.272
SRLS Factors	.509	.039	.524	13.217**
EIUSB Scale	.285	.033	.341	8.609**

$R=.728$ $R^2=.530$ $F=198.142**$

* $p<0.05$ ** $p<0.01$

The fact that, results of the variance analysis seen on table 3 is meaningful at $p<0.01$ level, shows that the variance the variables explain are statistically meaningful. According to the result of the analysis, when all variables are dealt with together, 53% of the total variance with regards to information literacy is explained. When parameters with regards to regression model is studied, standardized regression coefficients (β), show that, priority sequence of predictive variables on information literacy; SRLS scale ($\beta=.319$; $t=7.894$; $p<0.01$), EIUSB scale ($\beta=.319$; $t=7.894$; $p<0.01$). When all the variables are dealt with, SRLS scale and EIUSB scale are determined as meaningful precursor of information literacy.

Sub-Problem 3. Are there the separately effects of educational internet use self-efficacy beliefs and self-regulated learning skills over information literacy of students?

The objective here is not to produce an estimation model, but to examine influence of variables on each other, simple linear regression was needed.

Prediction power of each variable with regards to Students' internet use self-efficacy and self-regulatory learning skills and related factors information on literacy levels was studied. While, we were looking into this question, simple linear regression analyses were done in order to determine whether independent variables predict information literacy meaningfully or not and the results were shown in Table 4.

Table 4. Simple Linear Regression Analysis Results relating to predict information literacy of educational internet use and Self-regulating Learning skills

Variables		B	Std Error _B	Standardized Coefficients β	R	R ²	t	F
SRLS and Factors	Motivation and action to learning	2.371	.188	.557	.557	.310	12.602**	158.804**
	Planning and determining aims	2.139	.157	.587	.587	.344	13.619**	185.465**
	Strategy using and assessment	1.072	.069	.639	.639	.408	15.608**	243.616**
	Lack of self-directedness	.024	.159	.008	.008	.000	.152	.023
EIUSB Scale Total		.454	.037	.544	.544	.296	12.186**	148.507**

When Table 4 is analyzed, it is observed that variance analysis results are meaningful at (F_{motivaston}=158.804, F_{Planning}=185.465, F_{Strategy}=243.616, F_{SRLS}=266.893, F_{EIUSB}=148.507) $p < 0.01$ level. The fact that variance analysis results are meaningful shows that there is a linear relation between dependent and independent variables. (Ergün, 1995). In the table it is seen that each variable of SRLS, EIUSB scale, Motivation and action to learning, Planning and determining aims, Strategy using and assessment, predicts information literacy positively meaningful ($p < 0.01$). When the variables are analyzed individually, it is observed that, 31% of information literacy is predicted by motivation and action to learning as, 34% Planning and determining aims, 41% Strategy using and assessment, 43% SRLS 'of variables, and 30% by EIUSB scale. When predictive variables coefficients are analyzed, it is observed that Strategy using and assessment variable has the highest (.639), EIUSB scale variable has the lowest, (.544) regression coefficient A SRLS scale factor, the lack of self-directedness is not a meaningful predictive of information literacy.

Sub-Problem 4. Does the effects of students' educational internet use self-efficacy beliefs and self-regulated learning skills on information literacy levels vary according to gender?

In the last sub-problem of the research, prediction power of male and female students' internet use self-efficacy and self-regulatory learning skills and factors on their information literacy levels was studied. In order to find an answer to this problem, prediction level of self- sufficiency and self-regulatory learning skills to information literacy for each gender was analyzed by multiple regression analysis and the results were given in Table 5.

The results of multiple regression analysis seen in Table 5, with regards to prediction of information literacy in male and female students, have shown that for both genders, educational use of the Internet self-efficacy and self-regulating learning skills for both gender are meaningful prediction means of information literacy, (F =45.772, $p < 0.01$; F=41.531, $p < 0.01$). The power of independent variables in information literacy regression is 45.8% for female students. In male students, this ratio is a little lower than female students and the rate is 41.5%. According to the standardized regression coefficients (β) in the table, the importance sequence of regressive variables on information literacy, for girls are; EIUSB Scale, Planning and determining aims, Strategy using and assessment, motivation and action to learning and lack of self-directedness, while for men Strategy using and assessment, EIUSB Scale, motivation and action to learning, Planning and see determining aims and lack of self-directedness. Among these variables, while for female students, EIUSB Scale ($t=5.324$; $p < 0.01$), Planning and determining aims ($t=3.140$; $p < 0.01$) and Strategy using and assessment ($t=2.314$; $p < 0.05$) are meaningful precursors; for male students the meaningful variables are; EIUSB Scale ($t=5.916$; $p < 0.01$), and Strategy using and assessment ($t=4.925$; $p < 0.01$) are meaningful precursors of information literacy.

Table 5. Multiple Linear Regression Analysis Results relating to predict information literacy of together educational internet use and Self-regulating Learning skills according to gender

Gender	Variables	B	Std Error	Standardized Coefficients β	t
Female	Constant	11.491	7.659	-	1.500
	Motivation and action to learning	.512	.341	.119	1.500
	SRLS Planning and determining aims	1.017	.324	.271	3.140**
	Factors Strategy using and assessment	.362	.156	.221	2.314*
	Lack of self-directedness	.013	.147	.005	.089
	EIUSB Scale	.259	.049	.323	5.324**
R=.775		R ² =.601		F=45.772**	
Male	Constant	2.087	8.284	-	.252
	Motivation and action to learning	.499	.282	.120	1.770
	SRLS Planning and determining aims	.394	.264	.110	1.495
	Factors Strategy using and assessment	.622	.126	.369	4.925**
	Lack of self-directedness	.198	.168	.062	1.176
	EIUSB Scale	.281	.048	.328	5.916**
R=.722		R ² =.521		F=41.531**	

*p<0.05

**p<0.01

RESULTS

As a result of the analysis made to identify the relations between Information Literacy (IL) Scale, Defining Information Needs, Access to Information, Use of Information, Ethical and Legal Settings in Use of Information factors and Educational Internet Use Self-Efficacy Beliefs (EIUSB) scale; the IL scale and Factors with EIUSB scale; have a significant positive relation. This result proves that students whose Educational Internet Use Self-Efficacy Beliefs is high also have a higher level of Information Literacy, Defining Information Needs, Access to Information, Use of Information, Ethical and Legal Settings in Use of Information. As a result of the analysis made to identify the relation between IL scale, Defining Information Needs, Access to Information, Use of Information, Ethical and Legal Settings in Use of Information factors with SRLSS scale and factor scores, there was found a positive correlation between IL scale and factors and Self-Regulated Learning Literacy (SRLS) Scale, Motivation and acting for the aim of learning, Planning and setting goals, Strategy use and evaluation factors. This result proves that students whose Self-Regulated Learning Literacy, Motivation and acting for the aim of learning, Planning and setting goals, Strategy use and evaluation levels is high also have a higher level of Information Literacy, Defining Information Needs, Access to Information, Use of Information, Ethical and Legal Settings in Use of Information. The results of this study are in parallel with the studies abroad. In a study conducted by Chye, Walker, Smith (1997) on university students, a high relation was indicated between self-regulation strategy use in a study, self-efficacy and academic success.

As a result of the analysis conducted in order to determine, to what degree Students' use of the internet self-efficacy and self-regulation skills and factors explain their information literacy, it was found that the variables explain %53 of the variance. This shows that students' use of the Internet self-efficacy and their self-regulatory learning skills has an impact on their information literacy. In addition to that, the results show that, self-regulation strategies have a higher share in prediction of information literacy compared to educational internet use self-efficacy. In order to analyze the distribution of the impact; as a result of the analysis to determine the individual effects of internet use self-efficacy and self-regulated learning skills and factors on students' information literacy; the most effective self-regulator among Self- Regulated Learning Literacy (SRLS) Scale; Strategy Use and Evaluation, Planning and Setting Goals, Motivation and Acting for the aim of learning and lastly, Educational Internet Use Self-Efficacy Beliefs (EIUSB). When impact percentages are analyzed, it is observed that the values are close to each other. This situation, shows that self-regulated learning has higher impacts than use of the internet self-efficacy on information literacy. As information acquisition and information access is a cognitive activity, this is an expected result. Self-regulation, is a process, during which, students create aims for learning, and determine strategies to fulfil these aims and evaluate the acquisition. According to Heo (2000), the cognitive strategies used in this process, help learners to acquire the information in a more effective way, store it and express it. Also, as Xiaodong (2001) expressed, knowledge of the individuals as to their own cognitive processes, and the information they use to control these processed are extremely effective. This is why, it is possible to say that; while the level of self-regulation strategies use, is a stronger variant in regression of student success, self- efficacy belief is a motivation for students to use their self-regulation strategies. Pintrich and De Groot (1990) Primary School seventh class in a research conducted on primary school students, they indicated that, self-efficacy and exam anxiety are important variable in predicting student

performance. Similarly, Andrew and Wialle (1998) indicated in a research on nursing students, that critical-thinking and the upper cognition self-regulation have meaningful relations to academic performance. In a study conducted on students who attend to secondary school, Malpass, O'Neil, Harold, Hovevar (1999) expressed that there is a positive relation between self-regulation and success.

When student's internet use self-efficacy and self-regulated learning skills and the effect of gender on these skills are studied with regards to students' information literacy; it is determined that, educational internet use self-efficacy and self-regulated learning skills are meaning precursors of information literacy for both genders. It was found that female students have higher prediction power of information literacy of independent variables compared to male students. While, EIUSB Scale, Planning and determining aims and Strategy using and assessment is a meaningful precursor for female students; for male students EIUSB Scale and using Strategy and assessment information are meaningful precursors of information literacy. Another result of the study is that, for female students, planning and determining aims effect is higher on information literacy, while for male students, EIUSB Scale and Strategy using and assessment effect is higher in comparison to the other gender. In a study Leung and Chan (1998) conducted with Pintrich and De Groot (1990), they found out that males have higher level of self-efficacy belief compared to females. In this study, in parallel with the studies conducted abroad, it is possible to say that male students have higher self-efficacy and intrinsic value perception and have more tendency to use strategy, and this effects their success.

Information literacy, and self-efficacy self-regulation are activities that can change according the field and context (Pintrich, 2000). Students can apply different strategies in each context. Therefore, it is possible to say that, these concepts are required to be analyzed in different contexts. The suggested studies in this field are; study of effects of self-regulation and self-efficacy on primary school first grade and second grade, and high school students, by studying these effects in various classes such as math, science and Turkish. A study of by studying with various age groups. Besides these studies, a study of the interaction between self-regulation, self-efficacy, family, teacher and success is among the suggested researchers.

References

- Adıgüzel, A. (2011). Bilgi Okuryazarlığı Ölçeğinin Geliştirilmesi. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, 17, 15-28.
- Andrew, S. & Vialle, W. (1998). Nursing students' self-efficacy, self-regulated learning and academic performance in science teaching. *Paper presented at the Australian Association for Research in Education Conference*. Retrieved March 9, 2003, from <<http://www.aare.edu.au/98pap/abs98.html>>.
- Artino, A.R. & Stephens, J.M. (2006). Using social cognitive theory to predict students' use of self-regulated learning strategies in online courses. *Paper presented at the 37th Annual Conference of the Northeastern Educational Research Association, Kerhonkson, NY*.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Chye, S., Walker, R.A., & Smith, I. (1997). Self-regulated learning in tertiary students: the role of culture and self-efficacy on strategy use and academic achievement. *Annual Conference of the Australian Association for Research in Education*. Retrieved March 12, 2003 from <<http://www.aare.edu.au/97pap/chyes350.htm>>.
- Compeau, D., Higgins, C.A., & Huff, S. (1999). Social cognitive theory and individual reactions to computing technology: A longitudinal study. *MIS Quarterly*, 23(2), 145-158.
- Crano, W.D., & Brewer, M.B. (2002). *Principles and methods of social research*. New Jersey, Lawrence Erlbaum Associates Publishers.
- Doyle, C.S. (1994). *Information literacy in an information society: A concept for the information age*. New York: Syracuse University.
- Ergün, M. (1995). *Bilimsel araştırmalarda bilgisayarla istatistik uygulamaları*. Ankara, Ocak Yayınları.
- Hennessey, S. (2009). *Information Literacy-Finding Information*, from address <http://www.collegeupgradingon.ca/current/infoliteracy/informationliteracy.pdf>. Date of 09.09.2012 downloaded.
- Heo, H. (2000). Theoretical underpinnings for structuring the classroom as self-regulated learning environment. *Educational Technology International*, 2(1), 31-51.
- Kalaycı, G. (2010). *SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri*. (3. Baskı). Ankara: AsilYayınDağıtım.
- Kauffman, D.F. (2004). Self-regulated learning in web-based environments: Instructional tools designed to facilitate cognitive strategy use, metacognitive processing and motivational beliefs. *J. Educational Computing Research*, 30, 139-161.
- Kızılaslan, D. (2007). *Bilgi Okuryazarlığı ve Üniversite Kütüphaneleri: Bilgi Okuryazarlığı Planı Hazırlama Unsurları*. Yayımlanmamış Yüksek Lisans Tezi, İstanbul Üniversitesi, Sosyal Bilimler Enstitüsü, İstanbul.
- Kinikin, J., & Hench, K. (2012). An Effective Method of Measuring Student Understanding of Library Research

- Skills. *Journal of Information Literacy*, 6(2), 86-96. from address <http://ojs.lboro.ac.uk/ojs/index.php/JIL/article/view/LLC-V6-I2-2012-2> Date of 19.02.2012 downloaded.
- Koç, S., & Koşaner, Ö. (2005). *Bilgi okuryazarlığı ve aktif eğitim: Bir uygulama örneği. II. Aktif Eğitim Kurultay Kitabı*. İzmir: Dokuz Eylül Yayınları.
- Kurbanoglu, S.S., & Akkoyunlu, B. (2002). Bilgi Okuryazarlığı: Bir İlköğretim Okulunda Yürütülen Uygulama Çalışması. *Türk Kütüphaneciliği* 16(1), 20-40.
- Leung, M., & Chan, K. (1998). *Gender and elective differences in the motivated strategies for learning of pre-service teacher education in Hong Kong*. Retrieved 27 December, 2003, from <<http://www.aare.edu.au/98pap/leu98366.htm>>.
- Malpass, J.R., O'Neil, J., Harold, F., & Hocevar, D. (1999). Self-regulation, goal orientation, self-efficacy, worry and high stakes math achievement for mathematically gifted high school students. *Roeper Review*, 21(4), 281-290.
- Pintrich, R.R. (2000). The role of goal orientation in self-regulated learning. In Boekaerts, M., Pintrich, P. R., ve Zeidner, M. (Eds.), *Handbook of Self-regulation*, (pp. 451-501), San Diego, CA: Academic Press.
- Pintrich, P.R., & De Groot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.
- Polat, C. (2005). *Üniversitelerde Kütüphane Merkezli Bilgi Okuryazarlığı Programlarının Geliştirilmesi: Hacettepe Üniversitesi Örneği*, Yayınlanmamış Doktora Tezi, Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.
- Polat, C. (2006). Bilgi Çağında Üniversite Eğitimi İçin Bir Açılım: Bilgi Okuryazarlığı Öğretimi. *A.Ü. Türkiyat Araştırmaları Enstitüsü Dergisi*, 30(29), 249-266.
- Schunk, D.H. (1994). Self-regulation of self-efficacy and attributions in academic settings, D. Schunk, B. J. Zimmerman. (Der.). *Self-Regulation of Learning and Performance*. New Jersey: Lawrence Erlbaum Associates Publishers.
- Şahin, İ. (2009). Eğitsel İnternet Kullanım Özyeterliği İnançları Ölçeğinin Geçerliliği ve Güvenirliği. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 21, 461-471.
- Turan, S. (2009). *Probleme Dayalı Öğrenmeye İlişkin Tutumlar. Öğrenme Becerileri ve Başarı Arasındaki İlişkiler*. Yayınlanmamış Doktora Tezi. Hacettepe Üniversitesi. Sosyal Bilimler Enstitüsü.
- Xiaodong, L. (2001). Designing metacognitive activities, *Educational Technology Research and Development*, 49(2), 23-40.
- Zimmerman, B. (2001). Theories of self-regulated learning and academic achievement: an overview and analysis. Zimmerman B. & Schunk D. (Eds), *Self-regulated learning and achievement theoretical perspectives* (2. ed.). London: Lawrence Erlbaum Associates.

Investigation Of The Secondary School Students Transition Situations Between Different Representation Types

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ABSTRACT

Representation types of knowledge are an important case/component of learning environments. The aim of this study was to investigate student performances to make transitions between graphical representation to text, picture and table representation types. The study was conducted as a case study. An achievement test for the pressure subject, including six questions, has been applied to 348 eighth grade students who have completed their education on the pressure issue. Analysis of participant responses were made in terms of a rubric developed. The study was concluded that students were insufficient in the transition between selected representation types.

Keywords: representation types, graphic, text, picture, table

INTRODUCTION

In our age, it can be said that communication is built in a faster and more efficient way in comparison to previous centuries. Individuals are expected to use any type of communication tools, sources and the skills that communication requires. Accordingly, it is significant that individuals are information-literate, draw conclusions, take conscious decisions, apply the knowledge that they have to new situations and produce new knowledge. So, individuals, especially the young generation need to have the capabilities of reading, listening and/or watching the information given in any form/representation such as oral, pictorial, graphical, textual and to switch between different knowledge representation types in order to make sense of the knowledge, make predictions or deductions when needed.

It is known that some challenges might be faced in learning/teaching some fundamental concepts/information in science education (Akdeniz, Bektaş & Yiğit, 2000; Yağbasan & Gülçiçek, 2003). So, using different representation types according to the level of the student in concretizing the information that is difficult to teach/learn is very significant. Representation here means to make sense of and show/present/reflect the existing knowledge; that is the reality, through various approaches (Zou, 2000). The representation of knowledge presents the knowledge in different formats, which plays a key role in science education. These representations can be in various formats such as text, figure, photograph, graph, table etc.

In learning environments, the presentation of the knowledge through multiple representations facilitates learning. The presentation of knowledge in different forms and in a switch between these forms provides students with the opportunity to compare different types of presentation and helps to construct the received knowledge in a controlled way (Kurnaz, 2011, 2013; Kurnaz & Yüzbaşıoğlu, 2013). Thus, the learners' using the knowledge presentation forms is closely associated with learning. In fact, learning is about presenting what is learnt in different forms which means by transforming the received knowledge into a different presentation type (Kurnaz, 2011). Accordingly, analyzing the learner's capability to switch between different types of representation is more important than his/her performance in using a representation type (Ainsworth, 1999). The importance of learners' using different representations correctly and associating them with one another has been stressed by some researchers (e.g. Even, 1998; Ainsworth, 1999; Çelik & Sağlam Arslan, 2012), which is also noticed in science curricula.

School is one of the ideal places where individuals can acquire the above-mentioned skills. So, more attention should be paid to the use of knowledge representation types that are frequently used especially in daily life. One of these is graphics. Graphics is a type of knowledge representation that reflects the relationship/information between two variables and is frequently encountered in different areas of daily life such as the Internet and TV programmes. For this reason, it is considered necessary that individuals do the shifts between graphical representation type and other representation types properly besides the skills related to reading and creating graphics.

In science lessons, reading, interpreting and creating graphs are very important, as in other lessons. Accordingly, it is seen in many studies (i.e. Ates & Stevens, 2003; Beichner, 1994; Berg & Smith, 1994; Kekule, 2008; McDermott, Rosenquist & van Zee, 1987; Sağlam-Arslan, 2009) that the focus is on students' reading and creating graphs and thus their most common deficiencies are identified. However, it is striking that students'

shift from graphics - a format of knowledge representation - to other representation types and vice versa has not been scrutinized enough in the related literature.

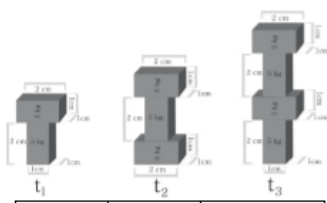
In this study, it is aimed to examine students' transition cases between graphic representation type and other text, figure and table representation types that are frequently used in learning environments (and in daily life).

METHODS

This is a case study. 348 8th grade students were asked 6 questions that requiring transition between representation types such as graph, text, figure and table related to 'pressure' subject. These representation types are frequently used in science education. The students completed the lessons on 'pressure' subject within the scope of the science course. In the questions, they were asked to create a graph based on the type of representation given in the form of text, figure or table or to show the information given in the graphic format, through text, figure or table. An example to these questions is given in Figure 1. The questions also indicate the limitations of this study.

1. According to the text, draw the graph showing change of pressure by time for the second case mentioned in the text.

While Okan is playing with a ball on a sandy surface, his ball gets caught in the branches of a tree and he can't get it despite all his efforts. Then, he suddenly notices the rocks at the bottom of the tree. He puts one rock at the top of another but still can't reach the tree. When he puts the first rock at the bottom he realizes that it sinks in the sand more. The weights of the rocks are the same but their sizes are different. Seeing this, he decides to put the 3rd rock at the bottom, then the 2nd and finally the first one at the top and he reaches the tree. In the second situation, Okan sees that the 3rd rock has not sunk a lot in the sand.

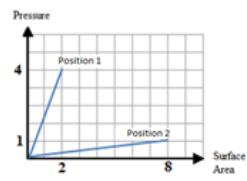


2. The sequencing of the identical blocks at moments of t_1 , t_2 and t_3 is like in the picture. According to the picture, draw the pressure-mass graph for the sequencing process of the bars.

situation	pressure	surface area
1	20	2
2	10	4
3	8	5
4	5	8
5	4	10

3. Kerem rotates a non-geometric shape clockwise. The pressure and surface area values exerted by the object are given on the table. According to the table, draw the graph showing the change of the relationship between pressure and surface area by time while the object is moving.

The values of pressure and surface area of a box in the shape of rectangular prism to the ground in two different positions have been given in the graph.



According to the graph

4. Draw separately the views of the box in the 1st and 2nd positions.

5. Draw the table giving the values of the pressure, surface area and force (weight) of the box in the 1st and 2nd positions.

6. Describe the relationship between the surface areas and the pressure.

Figure 1. Sample question

The participating students completed the lessons on pressure subject, and the analysis of the students' answers was carried out using a rubric. Accordingly, the students' answers were categorized as No Answer/Meaningless, Wrong, Partially Right Having Some Wrong Content, Partially Right with No Wrong Content, and Right (Table 1).

Table 1. Analysis Rubric Concerning the Students' Answers

Code	Explanation
Right Answer	The answer consistent with scientific knowledge
Partially right answer that doesn't have any wrong content	The answer consistent with scientific knowledge but not adequate
Partially right answer that has wrong content	The answer having some content that is consistent with scientific knowledge and some content that is inconsistent with scientific knowledge
Wrong Answer	The answer that is not consistent with scientific knowledge
No answer	No answer or the answer does not make sense.

RESULTS

The distribution of student achievement within the scope of this study is given in Table 2.

Table 2. The distribution of student achievement in transition between the types of representation

Type of Transition	Question	Right Answer		Partially with No Wrong Content		Partially Having Wrong Content		Wrong Answer		No Answer	
		f	%	f	%	f	%	f	%	f	%
From Text to Figure	1	9	2.6	15	4.3	54	15.5	77	22.1	193	55.5
	2	8	2.3	2	0.6	35	10.1	190	54.6	113	32.5
	3	36	10.3	86	24.7	82	23.6	120	34.5	24	6.9
From Figure to Table	4	4	1.1	43	12.4	51	14.7	149	42.8	101	29
	5	42	12.1	55	15.8	21	6	92	26.4	138	39.7
	6	91	26.1	25	7.2	25	7.2	79	22.7	128	36.8

As it is seen in the Table 2, more than half of the students failed while transition between the indicated representation types or left the questions unanswered. It is seen that there are very few number of students in the right answer category for switches between all indicated types of representation. It is also noteworthy that nearly 25% of the students were successful in transition from graph to text only. The examples to the students' wrong answers that repeat most frequently are presented in Figure 2.

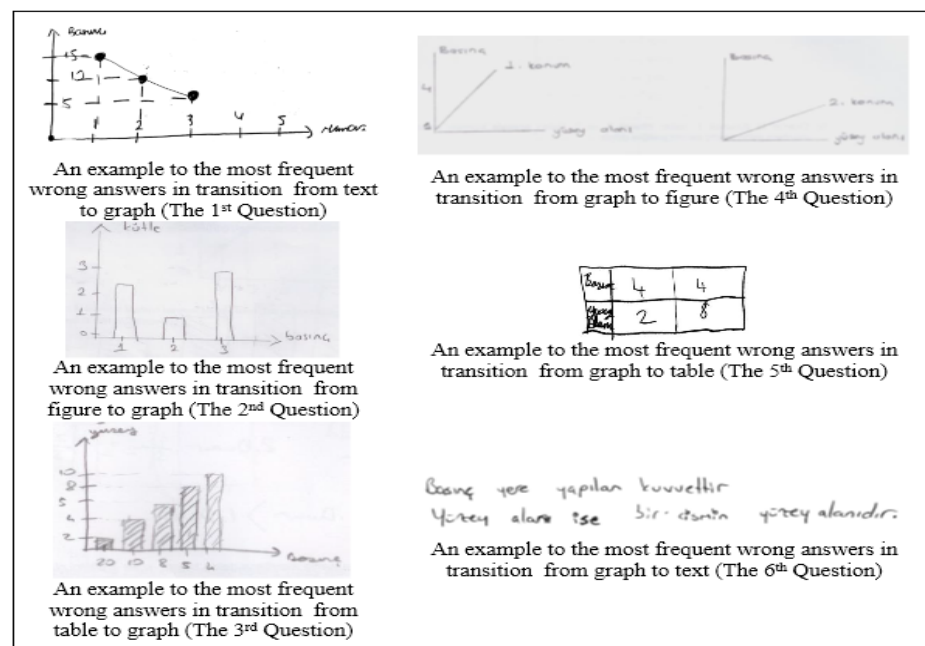


Figure 2. Examples to the Most Frequent Wrong Answers

In regard to the switch from text to graph, it is clear that students could not understand the situation right and drew graphs having wrong values. In the second question, there was a process in the switch from figure to graph, and students had problems in placing the right values on the graph. As for the third question asking the change of the values in the table by time/situation, the students could not construct ‘the change of pressure-surface area’ on a process basis. In the fourth question, transition from graph to figure, the students tried to draw another graph. In fact, they were expected to picture simply the box based on the graph showing the features of the box in different positions. In the fifth question, transition from graph to table, the students could not place the values given in the graphic in the table, which was the most common failure. In the sixth question, transition from graph to text, they showed a tendency to indicate the relationship between pressure and surface irrespective of the graph that was given.

DISCUSSION AND CONCLUSION

In this study, it has been concluded that students are incompetent in transition from graph to other representation types such as text, table, and figure and vice versa. The underlying reason in the failure of students in transition from graph to other representation types and vice versa is that the situations involving switch between the representation types such as text, figure, table, and graph are not sufficiently covered in the end-of-unit assessment questions and in textbooks which are parts of the learning environment. It is also striking that the students reflect the graph as a draft or figure of the reality rather than a symbolic representation of knowledge. The fact that students did not perceive graphics as a symbolic representation of knowledge, which may be one of the reasons behind the incompetency of students in the switches, is consistent with the findings of similar studies (e.g. Berg and Smith, 1994; Kekule, 2008). In other words, students might be attaching a different meaning to representation types, which is another issue to be researched.

Being able to present the knowledge in multiple representations indicates that the learner has grasped the subject. However, this ability/competence of presenting the knowledge through multiple representation types should be supported in learning environments. For this reason, this ability/competence is one of the abilities/competences that teachers must have. Nevertheless, challenges are faced in both learning and teaching some science concepts (Sağlam Arslan & Kurnaz, 2009). Thus, the incompetence of teachers regarding the presentation of knowledge through multiple representations may have caused the participating students to fail in the present study.

Based on the result obtained in this study, it is recommended to;

- give more place to interesting / accentuating teaching practices,
- accordingly rearrange the assessment questions in the textbooks, and
- ensure that teachers give importance to questions that reflect the switches between representation types in evaluation and assessment processes

with regard to the switches from graph to representation types such as text, table, and figure and vice versa in science education.

References

- Akdeniz, A., Bektaş, U., & Yiğit, N. (2000). İlköğretim 8. sınıf öğrencilerinin temel fizik kavramlarını anlama düzeyi, Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 19, 5-14.
- Ates, S. & T.J. Stevens (2003). Teaching line graphs to tenth grade students having different cognitive developmental levels by using two different instructional modules. *Research in Science & Technological Education*, 21(1), 55-66.
- Ainsworth, S.E. (1999). A functional taxonomy of multiple representations. *Computers and Education*, 33 (2/3), 131-152.
- Beichner, R. (1994). Testing students' interpretation of kinematic graphs. *American Journal of Physics*, 62(8), 750-762.
- Berg, C. and P. Smith, (1994). Assessing students' abilities to construct and interpret line graphs: Disparities between multiple-choice and free responses instruments. *Science Education*, 78(6). 527-554.
- Çelik, D., & Sağlam Arslan, A. (2012). The Analysis of Teacher Candidates' Translating Skills in Multiple Representations. *Elementary Education Online*, 11(1), 239-250.
- Even, R. (1998). Factors Involved in Linking Representations of Functions. *Journal of Mathematical Behavior*, 17(1), 105-121.
- Gülçiçek Ç. & Yağbasan R. (2003). Fen Öğretiminde Kavram Yanılgılarının Karakteristiklerinin Tanımlanması. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 13, 110-128.
- Kekule, M. (2008). Graphs in physics education. *GIREP 2008 Conference Physics Curriculum Design, Development and Validation*, August 18-22, Nicosia, Cyprus.
- Kurnaz M. A. (2011). Enerji Konusunda Model Tabanlı Öğrenme Yaklaşımına Göre Tasarlanan Öğrenme Ortamlarının Zihinsel Model Gelişimine Etkisi. *Yayınlanmamış Doktora Tezi*, Karadeniz Teknik Üniversitesi, Trabzon, Türkiye.

- Kurnaz, M. A. (2013). Investigation of the student teachers' skills of transition between multiple representations about pressure. *International Journal of Academic Research Part B*, 5(1), 66-71.
- Kurnaz, M. A. & Yüzbaşıoğlu, M. A. (2013). Ortaöğretim Kurumlarına Geçiş Sınavlarının Gösterim Türleri Arasındaki Geçişler Açısından İncelemesi, *Bartın Üniversitesi Eğitim Fakültesi Dergisi*, 2(2), 267-279.
- McDermott, L.C., M.L. Rosenquist and E.H. van Zee, 1987. Students' difficulties in connecting graphs and physics: Examples from kinematics. *American Journal of Physics*, 55(6): 503-513.
- Sağlam Arslan, A., 2009. Cross-grade comparison of students' understanding of energy concepts. *Journal of Science Education and Technology*, 19(3): 303-313.
- Sağlam Arslan, A. & Kurnaz, M.A. (2009). Prospective physics teachers' level of understanding energy, power and force concepts. *Asia-Pacific Forum on Science Learning and Teaching*, 10(1), Article 6.
- Zou, X., The Use of Multiple Representations and Visualizations in Student Learning of Introductory Physics: An Example from Work and Energy Documents, Thesis (PhD), The Ohio State University, 2000.

Involvement Load Hypothesis Revisited: Task Effectiveness On L2 Vocabulary Learning

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ABSTRACT

It is suggested that effective L2 vocabulary learning involves elaborate processing in which attention to different aspects of words is needed to enhance learning. Laufer and Hulstijn (2001) propose a framework, the Involvement Load Hypothesis (ILH), to conceptualize elaborate processing. ILH conceptualizes elaboration in terms of a cognitive and motivational framework consisting of three components (i.e., need, search, and evaluation). Each component can be measured independently and its weight ranges from weak to strong. Tasks with same involvement load, are assumed to contribute equally to L2 vocabulary learning. The purpose of this study was to investigate the effects of task-induced involvement on L2 vocabulary learning by examining the extent to which vocabulary tasks with the same and varying degrees of task-induced involvement load contribute to vocabulary learning gains. Four vocabulary learning tasks with different combinations of involvement indexes were designed for the purpose of the study. Ninety-six Taiwanese college-level participants were randomly assigned to four groups, each performing one of the tasks that involved reading a text with fourteen target words. The participants' knowledge of the words were both pre- and post-tested. The results indicated that tasks with the same involvement load did not lead to similar learning gains. Implications of the study will be discussed.

Keywords: Involvement load hypothesis, L2 vocabulary learning, reading-plus tasks, writing tasks

INTRODUCTION

L2 vocabulary development through reading is a complex process in which various components are involved and integrate with one another. In particular, learners need to allocate attentional resources to the word's orthographic and semantic properties (Schmidt, 2001). They must also attend to the connections between new lexical forms and their meanings and also associate the word with their existing knowledge sources or maintaining it in their working memory for rehearsal (Ellis, 1994; Hulstijn, 2001; Pulido, 2007; Rott, 2007).

An attempt to operationalize the construct of attention is Laufer and Hulstijn's (2001) Involvement Load Hypothesis. Involvement Load Hypothesis conceptualizes attention in terms of three major task components: need, search, and evaluation. Whereas a moderate need is externally imposed by the teacher or the task, a strong need is self-imposed by the learner, such as finding a word's meaning by looking it up in a dictionary. 'Search' is moderate when learners try to seek the meaning to match a word's form, and it is strong when the focus is on finding a word's form to match its meaning (Nation, 2001). 'Evaluation' ranges from weak to strong, including the comparison of an unfamiliar word with other words (weak), comparing the specific meaning of a word with other meanings of the same word (moderate), or assessing whether a word fits a specific linguistic context (strong). The involvement load hypothesis weights these three factors equally and assumes that the greater the involvement in a given task, the better vocabulary learning and retention.

Recently, a number of studies have examined the role of Involvement Load Hypothesis in vocabulary learning (Eckerth & Takavoli, 2012; Keating, 2008; Kim, 2008; Laufer, 2003; Laufer & Hulstijn, 2001; Laufer & Rozovski-Roitblat, 2011; Nassaji & Hu, 2012; Pulido, 2007, 2009; Peters, 2012; Peters, Hulstijn, Sercu, & Lutjeharms, 2009; Rott, 2007). For example, to investigate the effect of involvement load on the retention of ten English words by young adult ESL learners, Hulstijn and Laufer (2001) designed an experimental study with three tasks comprising different involvement loads (i.e., reading comprehension, comprehension plus filling in target words, and composition writing with target words). That is, these three tasks consisted of various combinations of need, search, and evaluation. The results indicated that retention was dependent on amount of task-induced involvement load: Retention was highest in the composition task, lower in reading plus fill-in, and lowest in the reading comprehension. The composition task yielded the highest retention as it consisted of higher involvement load than the other two tasks. Partially replicating Hulstijn and Laufer's (2001) study, Kim (2008) investigated whether different levels of task-induced involvement load affected the initial learning and subsequent retention of target words by L2 learners. The results proved to be consistent with the assumption that higher involvement induced by the task results in effective initial learning and better retention of new words.

Nassaji and Hu (2012) investigated the effects of task-induced involvement load (Laufer & Hulstijn, 2001) on Chinese ESL learners' use of lexical inferencing strategies and vocabulary retention. Three texts, which differed from one another in terms of their degrees of learner involvement, were designed. Each of the participants was assigned to read one of the texts randomly and infer the meanings of 10 target words in the text. The quantitative data analysis provided evidence for the Involvement Load Hypothesis in lexical inferencing.

Recent research into task effectiveness has also compared the effect of specific vocabulary tasks such as reading-only tasks, reading-plus task, i.e., or reading followed by word-focused activities (Keating, 2009; Laufer & Rozovski-Roitblat, 2011; Peters, 2012; Peters et. al, 2009). Examples of word-focused activities include those such as a fill-in-the-blank task, a sentence-writing task, and a composition-writing task. Laufer (2005, 2006, 2011) has integrated word-focused activities in her recent studies, arguing that attention in the learning process should be drawn to the lexical items. The assumptions for the superiority of word-focused activities are based on the idea that "retention of new information depends on the amount and quality of attention that individuals pay to various aspects of this information...since form-focused tasks induce elaborative attention to words' formal and semantic features, they are also conducive to their retention" (p. 395, Laufer & Rozovski-Roitblat, 2011). Keating (2009) claimed that ideas from Involvement Load Hypothesis are not typically embedded into the context of form-focused instruction, but it is obvious that increased involvement load generally entails greater focus on form in the tasks that require the two cognitive components of search and evaluation. Research also lends support to the superiority of tasks with greater involvement load such as reading-plus versus reading-only tasks (Keating, 2009; Kim, 2008; Laufer & Rozovski-Roitblat, 2011; Eckerth & Tavakoli, 2012; Peters et. al, 2009; Peters, 2012). However, studies comparing the effects of reading-plus and writing tasks have shown different results. For example, Keating (2009) examined whether tasks with different involvement load leads to differential word gains. Three tasks were used: reading comprehension plus marginal glosses, reading comprehension plus fill-in, and original sentence writing. The results indicated that participants in the 3rd task performed the best in immediate recall. Keating then suggested that a word-focused task without reading may be the most beneficial for vocabulary learning. Kim (2008) also found similar results in her study. Eckerth and Tavakoli (2012) investigated the effect of word frequency and elaboration on learners' vocabulary learning. The factor of elaboration was operationalized in terms of different degrees of task-induced involvement and the three tasks used were: reading with marginal glosses, reading with a fill-in-the-blank, and reading with marginal glosses then followed by writing a related composition. Based on the findings, Eckerth and Tavakoli suggested that a task with input-and-output cycle (i.e., a task integrating reading with writing) was more conducive than the other two. Overall, the previous research has indicated that a task with greater involvement load would lead to better learning.

Another area that recent research has examined is the effectiveness of tasks with the same involvement load but with different combinations of the three involvement load factors. For example, Laufer (2003) conducted an experiment in which 90 Arabic learners of English were asked to complete three tasks with the same involvement indexes and the learners were tested on word retention after each task. The three groups differed significantly in their posttest scores, suggesting that each of the three components (i.e., need, search, and evaluation) might contribute differently to the learning tasks. Kim (2008) examined whether two tasks (i.e., writing composition and writing sentences), which were assumed to involve the same theoretical level of task-induced involvement, would have the same effects on initial learning and subsequent retention of new words. The results provided evidence that tasks with the same involvement loads were equally beneficial for vocabulary learning. However, Kim further suggested that different degrees (i.e., moderate and strong) of each individual component (i.e., need, search, and evaluation) might not contribute to the same weights and strong evaluation might be the most influential factor for learner's initial vocabulary acquisition. Kim called for more studies to investigate the value of each individual component and also those with multiple treatments for each task.

Overall, the above studies are consistent with the assumptions in the Involvement Load Hypothesis. That is, the higher involvement in a learning task leads to better vocabulary learning. There have also been some studies on tasks with same degree of involvement load. However, few studies have compared tasks with similar and different involvement load and the degree to which they contribute to vocabulary learning. Thus the main purpose of this study was to address this question. The following research questions were investigated:

1. To what extent did vocabulary tasks with the same involvement load contribute to L2 vocabulary learning?
2. To what extent did vocabulary tasks with different types of form-focused activities contribute to L2 vocabulary learning?
3. How did the tasks with and without word-focused activities contribute to L2 vocabulary learning?

METHODOLOGY

Participants

The participants were Taiwanese college-level first-year and second-year business majors, who had at least 6~7 years of English learning experiences. They were recruited in the intermediate General English classes at the Universities of Technology in Central Taiwan, and the total number of participants was 96. Each had a CSEPT (College Student English Proficiency Test) score between 130 and 170, which was approximately equivalent to the low-intermediate level (https://www.lttc.ntu.edu.tw/CSEPT_main.htm). The participants were assigned randomly to four conditions as described below.

The texts and the target words

The text was selected from an ESP textbook used for Taiwanese college-level business majors (ESP: English for Economics by National Cheng Kung University Professional English Teaching Team), and the content of the text was about introductory economics. It was chosen because all the students, as business majors, were required to take some courses in introductory economics. The text length was 596 words, with 14 target words accounting for no more than 2% unfamiliar words to allow for the pick-up of some new vocabulary learning (Hu & Nation, 2000). The target words chosen for this study were those from the Academic Word List (Coxhead, 2000). The academic words used for this study were screened by using the AWL Highlighter (<http://www.nottingham.ac.uk/~alzsh3/acvocab/awlhighlighter.htm>). A pilot study with similar participants was conducted to exclude to see which of the target words were familiar to students and those words were replaced with unfamiliar words.

Research design

As noted earlier, one of purposes of this study was to examine the extent to which vocabulary tasks with same or different involvement load indexes contribute to vocabulary learning. Another purpose was to investigate how tasks with and without word-focused activities affect learners' vocabulary learning. As a result, four reading tasks were used that consisted of different types of word-focused activities: Reading a text with multiple-choice items, reading a text and choosing definitions, reading a text plus fill in the blank, and reading a text and rewording the sentences. The four tasks are described below.

1. In the first task, learners were asked to read a text in which the target words were highlighted. Upon finishing reading the text, the participants had to answer several multiple-choice questions focusing on the comprehension of a section of text containing the target word.
2. In the second task, the target words were highlighted. Upon finishing reading the text, the participants were required to choose a correct definition of each target word.
3. In the third task, the learners had to read the text with some blanks to fill it. The target words were provided on a separate piece of paper with L1 translations and L2 explanations (or synonyms), as well as a sample sentence containing the target word. Some extra words were offered as distractors.
4. In the fourth task, the target words were highlighted. Upon finishing reading the text, the learners had to rewrite the sentences drawn from the text containing the target words.

Table 1 summarizes the four vocabulary tasks and their scores with involvement load indexes. Ranking of the four conditions are based on those criteria suggested by Laufer and Hulstijn (2001). Three of the tasks had the same task-induced involvement index of 3 but with different combinations of the three factors (i.e., tasks 1, 2, and 4), and one task had an involvement index of 2 (i.e., task 3). That is, task 3 is supposed to yield the lowest learning score based on the assumptions of Involvement Load Hypothesis.

Table 1. Involvement load indexes for the four tasks

Task types	Need	Search	Evaluation	Involvement load index
Multiple-choice items on text	1	1	1	3
Reading words and choosing definitions	1	1	1	3
Reading plus fill in the blanks	1	0	1	2
Sentence rewording	1	1	1	3

To measure learners' knowledge and performance before and after the tasks, a pre-test and post-test on word receptive knowledge were given to the participants.

RESULTS

The first analysis examined how tasks with the same involvement load contribute to vocabulary learning. To investigate this question, a one-way ANOVA was conducted on learners' pre-test scores, during-task performance, and posttest scores. Table 2 summarizes the means, standard deviations (SD), statistical significance, and p value for the current analysis. No significant effect of type of task was observed on the pre-test score at the $p < 0.05$ level, with conditions $[F(3,82) = 0.095, p = 0.963]$. A significant effect of type of task was observed on the during-task score at the $p < 0.05$ level for the four conditions $[F(3, 49.876) = 15.142, p < 0.001]$, with $p = .000$.

Table 2. Results of ANOVA for the pre-test, during-task, and post-test scores

Dependent Variable	Tasks	Mean (SD)	F-Test	p-value
Pre-test score	Task 1	1.25 (1.26)	0.095	0.963
	Task 2	1.167 (1.404)		
	Task 3	1.042 (1.429)		
	Task 4	1.125 (1.424)		
During-task score	Task 1	5.25 (2.111)	9.888 ^{***a}	0.000
	Task 2	7.167 (2.548)		
	Task 3	6.75 (5.277)		
	Task 4	2.417 (2.466)		
Post-test score	Task 1	2 (1.642)	0.27	0.847
	Task 2	2.375 (2.856)		
	Task 3	2.042 (2.386)		
	Task 4	2.5 (2.246)		

Note: ^{***} $p < 0.05$.

Post hoc comparison was conducted on during-task performance scores, and task 2 showed the highest mean, which was significantly larger than task 1 and task 4. The mean of task 4 was significantly smaller than the mean of the other three tasks. No significant effect of type of task was observed on the post-test score at the $p < 0.05$ level for the four conditions $[F(3, 82) = 0.27, p = 0.847, \eta^2 = 0.847]$. These results show that tasks with same degrees of task-induced involvement did not contribute similarly to learners' during-task performance but they did so to their post-test scores.

The analysis then examined how tasks with different involvement load contribute to vocabulary learning. As seen in table 1, task 3 yielded the lowest involvement load with an index of 2, as compared to the other three tasks with an involvement index of 3. However, the post hoc comparison (table 3) indicated that participants in task 4 differed significantly from those doing the other three tasks, but there were no significant differences for participants doing tasks 1, 2, and 3. That is, the results did not support the hypothesis that participants did not perform differently in tasks with varying degrees of involvement load.

Table 3. Post hoc multiple comparisons across the four tasks

Task types	Between-task	Mean difference	Sig.
Task 1	task 2	-1.9167	.050
	task 3	-1.5000	.124
	task 4	2.8333*	.004
Task 2	task 1	1.9167	.050
	task 3	.4170	.124
	task 4	4.7500*	.004
Task 3	task 1	1.5000	.124
	task 2	-.4170	.668
	task 4	4.3333*	.000
Task 4	task 1	-2.8333*	.004
	task 2	-4.7500*	.000
	task 3	-4.3333*	.000

*The mean difference is significant at the 0.05 level

DISCUSSION AND CONCLUSION

This study compared to what extent vocabulary tasks with the same or different degrees of involvement load contribute to L2 vocabulary learning. The results showed significant differences across the 4 groups, suggesting that all four task types affected lexical retention. The results also indicated that there were no significant differences among tasks with different involvement load in terms of neither their during-task performance nor post-test scores. On the other hand, participants doing tasks with same involvement load did not have similar during-task scores but their post-test scores were quite similar. The results suggested that tasks with a higher involvement load did not necessarily yield better learning (tasks 1, 2, and 4), and vice versa for the task with a lower index (task 3). The findings suggested there may be differences in terms of the weight of each component, or there may be some component missing in the Involvement Load Hypothesis.

This study also examined how tasks with and without word-focused activities contribute to L2 vocabulary learning. Participants got better scores in the second and third tasks than the first task with their during-task performance, suggesting that students were more likely to learn new words when the exercises are form-focused, that is, directly related to the target words. This finding is consistent with previous research in which the reading-plus task was proven to be more effective than the reading-only one (Keating, 2009; Kim, 2008; Laufer & Rozovski-Roitblat, 2011; Eckerth & Tavakoli, 2012; Peters et. al, 2009; Peters, 2012). In the second and third tasks, participants' attention was drawn more to the target words, which could result in more elaboration of the word's semantic and orthographic features, whereas in the first task participants were required to focus on comprehending the text in general. In particular, tasks 2 and 3 offered participants opportunities to consolidate their knowledge of form-meaning connections and further enhanced the chances of words being learned at a preliminary learning stage. However, participants doing task 4 did not learn more words with their during-task performance. The reasons could be due the proficiency levels of the participants, who were low-intermediate EFL learners in this study. These learners are lack of adequate training in writing activities in the current curriculum design with a focus on achieving the CEF (Common European Framework) A2 and B1 proficiency level tests (e.g., TOEIC), which mainly consist of multiple-choice questions. However, a noteworthy issue in this study was that participants in task 4 (sentence rewording) had the worst during-task performance but they had the best retention score in the posttest as compared to the three other tasks, despite of no significant differences. One possibility was that the participants had to spend more time and focus on the original sentences containing the target words while being asked to rewrite the sentences. As a result, more elaborate attention was being paid to the target words and more in-depth thinking was required in task 4 as compared to the three other tasks simply asking the participants to make a decision out of the given options. The finding that participants in tasks 1, 2, and 3 retained fewer words was also consistent with some previous research in which participants forgot more given that they learned more at an earlier stage (Hulstijn, 2003; Peters et. al., 2009).

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References

- Coxhead, A (2000). A new academic word list. *TESOL Quarterly*, 34(2), 213-238.
- Craik, F. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behaviour*, 11, 671-684.
- Craik, F. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology*, 104, 268-294.
- Eckerth, J. and Tavakoli, P. (2012). The effects of word exposure frequency and elaboration of word processing on incidental L2 vocabulary acquisition through reading. *Language Teaching Research*, 16 (2), 227-252.
- Ellis, N. (1994). Consciousness in L2 learning: Psychological perspectives on the role of conscious processes in vocabulary acquisition. *AILA Review*, 11(1), 37-56.
- Hulstijn, J. H. (1992). Retention of inferred and given word meanings: Experiments in incidental vocabulary learning. In P. Arnaud & H. Bejoint (Eds.), *Vocabulary and applied linguistics* (pp. 113-125). London: MacMillan.
- Hulstijn, J. H. (2001). Intentional and incidental second-language vocabulary learning: A reappraisal of elaboration, rehearsal and automaticity. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 258-286). Cambridge, UK: Cambridge University Press.
- Hulstijn, J. H., & Laufer, B. (2001). Some empirical evidence for the involvement load hypothesis in vocabulary acquisition. *Language Learning*, 51(3), 539-558.

- Keating, G. (2008). Task effectiveness and word learning in a second language: The involvement load hypothesis on trial. *Language Teaching Research*, 12(3), 365-386.
- Kim, Y. J. (2008). The role of task-induced involvement and learner proficiency in L2 vocabulary acquisition. *Language Learning*, 58(2), 285-325.
- Laufer, B. (2003). Vocabulary acquisition in a second language: Do learners really acquire most vocabulary by reading? Some empirical evidence. *Canadian Modern Language Review*, 59, 567-587.
- Laufer, B., & Hulstijn, J. (2001). Incidental vocabulary acquisition in a second language: The construct of task-induced involvement. *Applied Linguistics*, 22(1), 1-26.
- Nagy, W. E., Herman, P., & Anderson, R. C. (1985). Learning words from context. *Reading Research Quarterly*, 20(2), 233-253.
- Nassaji, H., & Hu, H. C. M. (2012). The relationship between task-induced involvement and learning words from context. *International Review of Applied Linguistics*, 50(3), 69-86.
- Nation, P. (2001). *Learning vocabulary in another language*. Cambridge, UK: Cambridge University Press.
- Paribakht, T. S., & Wesche, M. (1999). Reading and “incidental” L2 vocabulary acquisition. *Studies in Second Language Acquisition*, 21(1), 195-224.
- Peters, E. (2012). The differential effects of two vocabulary instruction methods on EFL word learning: A study into task effectiveness. *International Review of Applied Linguistics in Language Teaching*, 50(3), 213-238.
- Peters, E., Hulstijn, J. H., Sercu, L., & Lutjeharms, M. (2009). Learning L2 German vocabulary through reading: The effect of three enhancement techniques compared. *Language learning*, 59(1), 113-151.
- Pulido, D. (2007). The effects of topic familiarity and passage sight vocabulary on L2 lexical inferencing and retention through reading. *Applied Linguistics*, 28(1), 66-86.
- Pulido, D. (2009). How involved are American L2 learners of Spanish in lexical input processing tasks during reading? *Studies in Second Language Acquisition*, 31, 31-58.
- Robinson, P. (2003). Attention and memory during SLA. In C. J. Doughty & M. H. Long (Eds.), *The handbook of second language acquisition* (pp. 631-678). Malden, MA: Blackwell Publishing Ltd.
- Schmidt, R. (2001). Attention. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 3-32). Cambridge, UK: Cambridge University Press.
- National Cheng Kung University ESP Team (2011). *ESP: English for Economics*. Taipei: Bookman.

Land Art And Contribution To Education Of Contemporary Art: New Style In Nature And Space Integration

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ABSTRACT

Land Art concept is developed in United States of America at the end of 1960's and inspired by other western countries in 1970's. Land Art movement is a new style which is intervention on nature by artists to integrate nature and space. In this movement, artists who use rock, soil and several natural materials, protest against galleries, museums and art markets.

In this research; Literature about Land Art and Artists of this movement, artworks and other art movements of this period, education of art, space concept are studied. This research is designed by descriptive scanning model. Researches about subject, indications and results are compared to build results and discussions part.

Keywords: Contemporary art, Land Art, space, art, artist.

INTRODUCTION

Art has undergone some change with artists' use of different techniques, approaches, and tools with the improvements in technology since 20th century. This change process in the field of art has led to change in the thinking way of artists. Aesthetic worries on the field in the past have resulted in new searches with the developments in technology. As a result of the new search, Land Art, which has a new perspective on nature and environment, has impacted many art movements as well as being impacted by them. Land Art, which is influenced by pre-historic works and local ecology, brings the relationships between people-nature, nature-space, and nature-art into the forefront. Land Art consists of artists that use the most up-to-date technology in their works. It is now linked to other forms of art such as Conceptual Art, Happening, Performance Art, Body Art, Arte Povera, and Minimalism. Land Art and other art movements related to it have influenced many contemporary artists in the field of art. Artists following this art movement have expanded space that is the implementation field of art. Artists have displayed their works in galleries after video recording or taking a photo to be permanent.

Problem Statement

In the contemporary art education process, the field of art that includes new and different experiences should be analyzed by considering its change and development in each period. Individuals try to keep themselves up-to-date on the novelties and conditions of each period in the field of art with the education they receive. Şahin (1993) states that "The purpose of art education is not only to educate future artists, but also to grow individuals who follow the new technology to search and use, and as a result to benefit more from art" (Şahin, 1993). In today's approach to art education, unique design is quite significant in that teaching the use of materials as constructive and productive in different implementations is considered as crucial, and it is proposed that especially contemporary approaches towards art products should be emphasized besides old art values and traditions (San, 1984). When contemporary art products are considered for a contemporary art education, analyzing interventions to nature and environment by Land Art artists contributes individuals to have a new perspective towards nature and space and to perceive and evaluate them by thinking thoroughly. In addition, it is expected that individuals will be directed towards research, because these works are based on projects that have been designed previously. Land Art samples presented to individuals through art education and the new approach that is brought by the movement will help individuals to try new things by getting beyond the limits of canvas surface. It is also expected that contemporary art works, which value thought before product and given message, and which are open to different techniques and materials, will increase the sensitivity of the individuals, enhance their creativity, and change their perspectives with the given art education. Individuals, who will be artists or art educators, should be knowledgeable about contemporary art perceptions as well as traditional ones. Understanding changes in art as a result of contemporary art education will contribute individuals to improve themselves. At this point, Land Art appears to be a new approach in the assimilation of nature to space.

LAND ART

Land has always been of secondary importance, as it is presented as a space for things that represent and are represented. Space is sometimes presented with a sense of emptiness while at other times it consists of figures and objects as a place to live or as a county or prairie image. For Land Art artists, the one which represents and is represented is itself. The artist, who works on rocks or trees in a specific place on land, refers to the whole land with the help of these materials and suggests protecting it. However, "protecting" actually means "respecting" it

(Yılmaz, 2006). The concept of Land Art first appeared in the United States towards the end of 1960s and expanded into Europe in 1970s. This movement, which aims to expand the application field of art and consisted of natural spaces instead of indoor spaces such as gallery or museum, is also interested in local ecology and rediscovery of archaic cultures (Germaner, 1997). Artists reorganize spaces that comprise of big parts of the land in these kinds of works of art. They limit the infinite gap or area to their works and expand the space. Some of the artists limit spaces that are comprised of frozen lake surfaces to various designs while other artists leave traces in the spaces by using rocks, sand, or similar materials over soil. Artists use spaces of both rural and urban settlements (Lynton, 2004). Artists have been intervening to these landscapes reflecting nature by transforming their spaces to real spaces since 1960s. Land Art, which emphasizes the negative effects of industrial development and technology, is a movement that aims to raise awareness and values nature over technology (Antmen, 2010). This movement values nature over everything and expands space on land as much as possible. Artists, who value nature, have brought a novel approach to the concept of space with their works of art. Space is similar to the nature in terms of quality in Land Art. Robert Smithson, Michael Heizer, Robert Morris, Walter De Maria, Nancy Holt, Alice Aycock, Mary Miss, Dennis Oppenheim, Jan Dibbets, Richard Long, Hamish Fulton, Andy Goldsworthy, Christo and Jeanne Claude are among the representatives of Land Art that assimilate space to nature.

LAND ART ARTISTS AND SAMPLES OF THEIR WORKS

According to Robert Smithson, who is a significant representative of the Land Art movement, mind and land are under the process of continuous wear and transfer. Mental rivers drag abstract coasts by wearing them, and thought breaks into pieces in ambiguous rocks. The language of art should not just be an isolated image, but should always be in a structure open to developments (Yılmaz, 2006). Artists always make references to mind and thought with the materials they use peculiar to nature such as rock, sand, salt, and water by designing large spaces. Artists present unusual works to the viewers with these spaces.



Figure 3. *Spiral Jetty* by Robert Smithson, 1970, mud, precipitated salt crystals, rocks, water coil. 1500' long and 15' wide Great Salt Lake, Utah, ABD⁷



Figure 4. *Broken Circle and Spiral Hill* by Smithson, 1971, green water, white and yellow sand diameter 140', canal approximately 12' wide, depth quarry lake 10 to 15' Emmen, Holland⁸

Figure 1 displays a spiral-shaped space that was designed by Smithson by using rocks, sand, and soil that come to the center of the lake from mainland. There are changes in water color as a result of depth with the fluctuating water in the space. The artist found out that there are microorganisms that make the big salty lake in Utah, which was a place to drill oil in the past, pink and worked on that work of art to draw attention to it (Turani, 2012). The spiral shape of jetty refers to the legendary vortex that is believed to be in the center of the lake. In his work, Smithson used approximately seven thousand ton soil by renting some garbage trucks. The artist wanted to grab attention to the relationship between human and nature by designing the jetty, which has a length of 1, 45 km, specifically in an industrial region. He emphasized natural life-death circle in his works. He separated samples of Land Art as "space and out of space" (Antmen, 2010). This work of the artist based on space was valued only after a while it was done. The artist worked on space that expanded to a large area.

Figure 2 displays another work of the artist who designed a circle, part of which consists of green water with white and yellow sand planes. Some part of the circle is surrounded with water while some part of it is filled with water. The artist aims to react to the unprincipled urban development and its insensitivity to the environment with his works (Cumming, 2008). The artist began his dialogues between inner space and outer space with his thought of "No Land" in 1967. The artist hung the air photos he took from a specific place next to

⁷ <http://imgkid.com/robert-smithson-spiral-jetty-film.shtml> accessed at 05. 02. 2015.

⁸ R. Cumming, (2006). Görsel rehberler sanat. İstanbul: İnkılâp Kitabevi, s. 462

the trapezoid shaped boxes, in which soil, stone, or pebble existed. The artist used spaces that he transformed into an object that won't be sold or is too big to display in a gallery as art material (Atakan, 2008).



Figure 5. Directed Seeding by Dennis Oppenheim, 1969, The route from Finsterwolde(location of wheat field) to Niece Schnapps (location of storage silo) was reduced by a factor of 6X and plotted on a 154 X 267 meter field Holland⁹

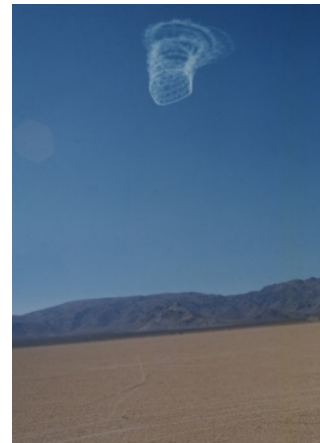


Figure 6. Whirlpool(Eye of the Storm) by Oppenheim, 1973
3/4 mile by 4 mile schemata of tornado, traced in the sky using standard white smoke discharged by an aircraft El Mirage Dry Lake, Southern California¹⁰

Figure 3 displays the "Directed Seeding" work by Dennis Oppenheim, who shaped the field by the help of a dredge. The artist first formed straight lines, then created waves parallel to each other in the field. He limited a specific area of an infinite space in his work. He intervened to the space itself and used only the natural space in his work.

Oppenheim is one of the American artists looking for empty spaces to object to be confined to gallery. Figure 4 displays one of his works, in which he rented a plane in order to create a tornado spiral in the clear sky over Mojave Desert and video recorded the event. Later, the tornado spiral was hung in a series of photographs on a gallery wall. The artist targeted for an art that produces thoughts on how to copy over a system or event (Bell, 2009). He created instantaneous images by using sky as a space in this work while he used land as a space in other works. He narrowed the space which is an endless gap in his work and filled the gap by creating a tornado spiral.



Figure 7. Sun Tunnels by Nancy Holt, 1973-76, Length of one diagonal: 26 m
Diameters: outside: 3,72 m, inside: 2,44 m
Great Basin Desert, Utah, ABD¹²



Figure 8. Rock Rings, *Stone Enclosure* by Nancy Holt, 1977-78, brown mountain stone outside 12 m, Western Washington University Bellingham¹¹.

As one of the Holt's astronomic art pieces, Sun Tunnels that is represented in Figure 5 consists of four large tunnels that are ordered crosswise in the Great Basin Desert in Utah, US. Tunnels are located in a way that they

⁹ <http://www.dennis-oppenheim.com/works/1969/144> accessed at 26.02.2015.

¹⁰ <http://www.dennis-oppenheim.com/early-work/155> accessed at 26.02.2015.

¹¹ www.studyblue.com accessed at 20.02.2015.

¹² www.tumblr.com accessed at 19.03.2015.

are aligned with the sun at the time of sunrise and sunset (Dempsey, 2012). Tunnels do not provide an artistic perspective during the day, but during the sunrise and the sunset. Viewers are taken to another space with the view that can be watched right in the center of the tunnels during the sunrise and the sunset.

Figure 6 represents another artwork of Holt, Rock Rings, which engages viewers into it deeply. When viewers are at the inside of the structure, they feel that they are in a cage. Rock Rings consist of two nested stone rings. Holt designed doors and windows on the stones to relate outer-space and inner-space perceptions of viewers.

Christo Javacheff, a Bulgarian artist, worked with his wife, Jean Claude, to design artworks that wrap-up structures and terrains. At the beginning, Christo wrapped-up simple objects such as beer bottles and barrels. Then he thought that if he increased the size of the wrapped objects, he would also increase the impact. For this reason, he manipulated the photos of famous buildings and gave them a wrapped look. These art-pieces, which include materials used in painting, sculpture, and architecture for centuries, were temporarily at the beginning. Being temporary brings death to mind and encourages people to think about nature, love, and value of sharing (Yılmaz, 2005). In addition, this process becomes an event when artists involved local people into the project development process. Because of the relationship between physical beauty of the nature and art project, artists changed perspectives of local people towards nature and art by involving them into the process (Üstüner, 1996).



Figure 9. *Surrounded Islands* by Christo and Jeanne-Claude,

Christo and Jeanne-Claude, 1980-83, Biscayne Bay Greater Miami, Florida¹³



Figure 10. *Wrapped Trees* by Christo and Jeanne-

Fondation Beyeler and Berower Park, Riehen, Switzerland, 1997-98, Photo: Wolfgang Volz¹⁴

Figure 7 displays eleven of the islands situated in Biscayne Bay, Greater Miami, which were surrounded with 6.5 million square feet (603,870 square meters) of floating pink woven polypropylene fabric covering the surface of the water and extending out from each island into the bay in 1983 (<http://christojeanneclaude.net/>). In this project, Christo and Jeanne covered the beach and part of the water and left plant cover and inner-space of the islands visible. They created various small inner-spaces inside the general work space, and because of the volunteer participants, art and life became intertwined.

Figure 8 displays the work of Christo and Jeanne-Claude, who have worked with trees for many years. The project originated in the 1960s, when the artists first proposed to wrap live trees. The Wrapped Trees in Riehen were the outcome of 32 years of effort (<http://christojeanneclaude.net/>). Under the scope of the project, the artists developed various designs before wrapping-up the consecutively-located trees. Because of the wrapped-trees, space gained an impressive perspective.

¹³ <http://christojeanneclaude.net/> accessed at 10.04.2015.

¹⁴ <http://christojeanneclaude.net/projects/wrapped-trees#.VUvyn7xrPIU> accessed at 26.02.2015.



Figure 11. A Line in the Himalayas by Richard Long, Date 1975, printed 2004
Medium Digital print on paper mounted onto aluminium
Collection Tate¹⁶

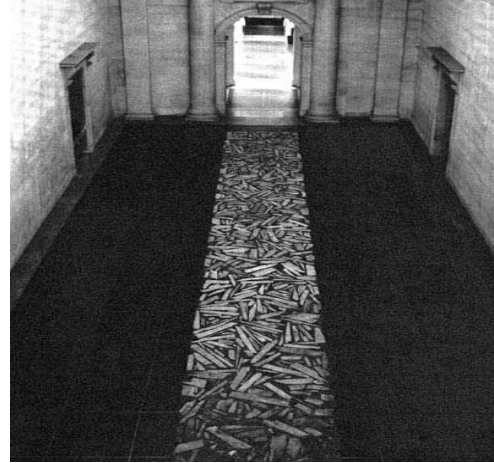


Figure 12. Cornish Slate Line by Richard Long, 1990, w230 x h2540 cm,
Anthony d'Offay Gallery, London¹⁵

Land-Art artists have also used photograph, graph, and text. Artists such as Dibbets, Goldworthy, LeWitt, and Long tried to record temporary modifications, natural events, and time flow in nature while trekking. As it is presented in Figure 9, Long designed installation art works by collecting mud, stones, and other materials while walking, and held exhibits to present pictures of his works (Dempsey, 2012). As Antment (2010) states, Long described his installation art works by saying:

“Walking is the expression of space and freedom, and its consciousness can live in everyone’s imagination which is also another space... Road is the space of travels. Hence, the space of a walk is its before and after.” (Antment, 2010, p. 260).

The linear statue displayed in Figure 10 was designed by slate stones collected during a walk in Kelt meadows. Each stone was selected arbitrarily, but reorganized to design a linear art piece (Kollektif, 1997). The artist exhibits the places where he collected the stones in gallery space because Long considers the impression of details of the place where he found the stones rather than the stone itself and carries overtones of the terrain by interpreting his own perspective (Hizmetli, 2009).



Figure 13. Storm King Wall by Andy Goldsworthy, 1997-98, fieldstone, Approx. 5 x 2,278 feet
Storm King Art Center,

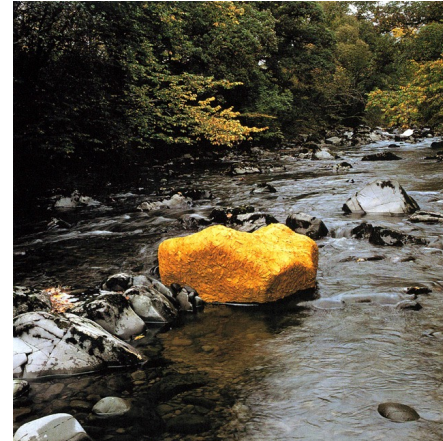


Figure 14. Yellow Elm Leaves Low Water 1991
by Andy Goldsworthy,
Scaur Water, Dumfriesshire, Scotland¹⁷

In Figure 11, Goldsworthy built the stone wall that wriggle between the trees and stones he encountered. The artist built the 695-meters-long wall with the help of British masons by using 1579 tons unprocessed stones. The

¹⁵ Anonim (1997). *Sanat kitabı: 500 sanatçı 500 sanat eseri*. İstanbul: Yem Yayın, s. 282.

¹⁶ <http://www.tate.org.uk/art/artworks/long-a-line-in-the-himalayas-t12035> accessed at 12.02.2015.

¹⁷ <http://www.abbeville.com/interiors.asp?ISBN=0789208814&CaptionNumber=03>, accessed at 19.02.2015.

wiggly stone wall passes through a lake and continues on ground till reaching a highway with the inclusion of a farm wall that was already there. As a result, art and nature was intertwined (Dempsey, 2012).

Goldsworthy is one of several artists who work mainly with their bodies rather than using tools or technology. He engages intimately with the environments in which he works, using materials from the sites themselves. Working in conjunction with a site's particular qualities – complexity, simplicity, delicacy, strength, changeability, varying shapes and textures – he brings out the dynamic possibilities of art and nature through space and time. Natural processes impede and support his artistic actions (Brady, 2007).

Under the scope of 4th “World Art Day” celebrations, 4th of which took place this year in Konyaaltı Beach in Antalya, Turkey, “Art Umbrellas” project was displayed as Land Art with the help of Berrin İlhan, who is the owner and curator of the project. Land-Art artists not only from Turkey, but also from overseas were invited to the organization to enrich universal language of art and to develop an international perspective. İlhan (2015) summarizes the goals and scope of the Land Art project as:

“Today, people have become distanced from art, which is the universal language, because of socioeconomic problems. We want to touch the heart of such disadvantaged group by meeting around similar interests, being under the umbrella that represents art, and using the comprehensive and connective language of art. Our main goal is to introduce national and international artists with our community to create a common ground for different imaginations and to create an awareness by speaking the universal language of art in addition to present April 15 World Art Day as a conceptual festival by accepting that creative action as a phase of interaction between human and nature.”

Artists participated in a project, which was announced at schools, rural areas, playgrounds, and even at women's prison with a slogan “Bring an Umbrella,” starting from April 15 as groups. Throughout the project, artists and people who become distanced from art and art excitement painted on umbrellas and 10-meter fabrics. Art and life became intertwined with the involvement of volunteer participants. The first phase of the project was started with mailing the umbrellas designed by participating artists to predetermined addresses as it can be seen in Figure 14.



Figure 15. “Art Umbrellas,” which was organized by Berrin İlhan, 2015, oil painting and acrylic on umbrella, acrylic on fabric, Antalya, Turkey.

As it is presented in Figure 13 and Figure 15, approximately 200 umbrellas were used along with 4 pieces 10 meters long canvas fabric to create two land-art projects on a 1000 square meter field in April 19th. By combining umbrellas with sand, sun, and sea, the artists tried to show that nature can be beautified again with the help of human, despite all the pollution caused by human. The purpose of the second land-art project is to form an S to show the artistic perspective of the land-art by combining letter “S” and canvas fabric to create a rhythm. At the final stage of the project, a mortar-iron construction scrap located on the beach was covered with umbrellas to deliver the message “ugliness created by human can also be beautified and repaired by human”.



Figure 16. Aylin Beyoğlu, “Art Umbrella”, 2015, oil painting on umbrella.



Figure 17. “Art Umbrellas”, 2015, Antalya, Türkiye

This land-art project emphasized that art cannot be separated from nature. It can take inspiration from nature and can be constructive and instaurative. It is foreseen that the project, which was organized in Konyaalti Beach in Antalya on April 19th, will be repeated in appropriate art spaces. It is also planned that a different application of the project will be organized in New York in near future.

METHODOLOGY

This study was investigated by doing a literature review of the images and texts that present the Land Art movement, the artists of the movement, and the space in their works, because the Land Art movement was created by considering contemporary art education and space concept in works of art. In this study, sources such as articles, journals, books, dissertations, etc. and visual documents were compared by analyzing them in detail through a descriptive survey model. Mostly, art books that focus on 20th century art, and dissertations on that topic were used in this study. Data out of these sources was interpreted. Data was found by doing an analysis of the documents in this qualitative study. Discussion and conclusion sections were written by considering the searches and findings.

DISCUSSION AND CONCLUSION

For a contemporary art education, it is important to include the developments in the field of art as well as in other fields into the education process by considering contemporary approaches and to give opportunity to the use of new knowledge, thought, applications, and approaches, one of which is Land Art, in an effort to support each other. In a study in 2006, Süsoy Şimşek emphasized the importance of the issue by stating, "Changing needs of artistic productivity and consumption requires cognitive work of art to be freed from all kinds of dogmas, to be liberally criticized, designed and shaped, not to be limited by certain wording and grouping with an individualistic and conscious attitude". Some of the artists tended towards nonpermanent production in their works of art. Because art is integrated into life. Therefore, it should be temporary and changeable just like life. As a result, it is thought to exceed the limits based on traditional techniques and understanding" (Şimşek, 2006). Land Art, which gives an opportunity to assimilate art into life, art into nature, and nature into space by getting out of traditional understanding and techniques, can be considered as a process to contribute to exceed the limits with regard to individual and art in contemporary art education. In another study on contemporary art education in 2008, Tanyolaç shares his thoughts on how to educate individuals open to novelties by stating, "Students should be provided with the freedom opportunity in such a broad perspective that they can choose the best way among a variety of options. It is significant to have a structure that is open to novelties constantly rather than having a set system in art education" (Tanyolaç, 2008). In his book, "Art From Modernism to Postmodernism", Yilmaz comments on the subject by stating "In art, 'embracing nature' instead of 'overcoming nature' means to exceed the limits of modernism. However, it is clear that this is something different from the tradition of old scenery. Because this is the transformation of scenery into nature and nature into art. This also means that everything that exists in nature becomes artistic indicators" (Yilmaz, 2006). Land Art, which is one of the movements that gives the opportunity to nature to transform into life, brings a new understanding to the nature, and as a result to the space. The contribution of the movement to the contemporary art education was analyzed with the use of samples presented through this study and obtained data.

As a result, Land-Art artists expand the space through their art works that consubstantiate nature and space. Artists reevaluate the natural layout and reinterpret with the help of technology. Generally, land-art artists spend individual efforts to convert their own pre-designed works of art to projects. By using natural materials, land-art artists transform nature to an art space and work of art through various projects in different settings. Artists take

photos or record videos of their temporary works of art, and present those at art exhibits and by doing that, the intended message is delivered to target viewers. Multi-dimensional thinking can be promoted when works of land-art designed by artists are used in modern art education. The contributions of this approach which includes existence of pattern, fact of projects, and application in practice, cannot be ignored in modern art education.

References

- Antmen, A. (2010). *20. Yüzyıl Batı Sanatında akımlar*(3. Baskı). İstanbul: Sel Yayıncılık, 251-252.
- Atakan, N. (2008). *Sanatta Alternatif arayışlar*. İzmir: Karakalem Kitabevi, 62-63.
- Bell, J. (2009). *Sanatın Yeni Tarihi*. (U. Ceren Ünlü). İstanbul: NTV Yayınları, 437.
- Brady, E., 2006. The Human-Nature Relationship in Environment and Land Art, *Art, Ethics and Environment*, pp. 287-300, Cambridge Scholars Press, Cambridge, 287-300.
- Cumming, R. (2006). *Görsel rehberler sanat*. İstanbul: İnkılap Kitabevi, 462.
- Dempsey, A. (2012). *Arazi Sanatı*. Sanatın Tüm Öyküsü.(Çev. Gizem Aldoğan). İstanbul: Hayalperest Yayınları, 533-534.
- Erzen, J. N. (1991). *Modernizm Sonrası Sanat, Çağdaş Düşünce ve Sanat*. İstanbul: Plastik Sanatlar Derneği Yayınları.
- Germaner, S. (1997). *1960 sonrası sanat(Akımlar, eğilimler, gruplar, sanatçılar)*. İstanbul: Kabalcı Yayınevi, 44.
- Hizmetli, S. (2009). *Land Art Akımı ve bir uygulama önerisi*, Yayımlanmamış yüksek lisans tezi, Cumhuriyet Üniversitesi Sosyal Bilimler Enstitüsü, Sivas, 83.
- Kollektif, (1997). *500 Sanatçı 500 Sanat Eseri*, İstanbul: Yapı Endüstri Merkezleri Yayınları, 282
- Lynton, N. (1993). *Modern sanatın öyküsü*. C. Çapan (Çev.). İstanbul: Remzi Kitabevi, 322.
- San, İ. (1984). Estetik eğitimin kısa tarihsel gelişimi ve çağdaş sanat eğitimi, *Öğretmen Dünyası Dergisi*, S(49), 7.
- Süsoy, Şimşek, E. (2006). *Kavramsal Sanatın Resim Sanatı Tanımını Etkileyişi ve Resim-İş Eğitiminde Getireceği Katkıları*. Yayımlanmamış yüksek lisans tezi, Ondokuz Mayıs Üniversitesi, Sosyal Bilimler Enstitüsü, Samsun.
- Şahin, C. (1993). Sanat eğitimi resim teknikleri ders notları, *Kütahya Hizmet İçi Eğitim Semineri*, 4.
- Tanyolaç, B. (2008). *Çağdaş Sanat Eğitimi Üzerine Model Araştırması*. Kocaeli Üniversitesi, Sosyal Bilimler Enstitüsü, Kocaeli.
- Turani, A. (2012). *Dünya sanat Tarihi*, İstanbul: Remzi Kitabevi, 758.
- Üstüner, H. Ş. (1996). Ekoloji ve İnsan İlişkisi, *Sanatta Yeterlilik Tezi*, İstanbul, 43.
- Yılmaz, M. (2006). *Modernizmden Postmodernizme sanat*. Ankara: Ütopya Yayınları, 238-245-254.

Internet References

- <http://christojeanneclaude.net/>
- <http://imgkid.com/robert-smithson-spiral-jetty-film.shtml> accessed at 05. 02. 2015.
- <http://www.dennis-oppenheim.com/works/1969/144> accessed at 26.02.2015.
- www.tumblr.com accessed at 19.03.2015.
- <http://christojeanneclaude.net/projects/wrapped-trees#.VUvyn7xrPIU> accessed at 26.02.2015.
- <http://christojeanneclaude.net/> accessed at 10.04.2015.
- <http://www.tate.org.uk/art/artworks/long-a-line-in-the-himalayas-t12035> accessed at 12.02.2015.
- <http://www.abbeville.com/interiors.asp?ISBN=0789208814&CaptionNumber=03>>, accessed at 19.02.2015.

Learning Factory Morphology – Study Of Form And Structure Of An Innovative Learning Approach In The Manufacturing Domain

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ABSTRACT

In academia and industry learning factories are established as close-to-reality learning environments for education and training in the manufacturing domain. Although the approach and concept of existing learning factories is often similar, orientation and design of individual facilities are diverse. So far, there is no structured framework to describe Learning Factory approaches. In the paper a multidimensional description model is presented in form of a morphology which can be used as a starting point for the structuring and classification of existing Learning Factory application scenarios as well as a support for the development and improvement of Learning Factory approaches.

INTRODUCTION

The intensifying consideration of action- and experience-based concepts for competence development in the field of education and vocational training results in an observable range extension of close-to-reality learning and teaching environments. While so called *Learning Factories* for education of future production engineers are leading the way, educational strategies for other occupational sectors also adapt the idea of learning factories, such as the chemical and pharmaceutical industry (Wüst, 2011) or the service sector (Hammer, August, 28th, 2014).

Since there is no globally accepted definition for learning factories as an educational facility and no consent on the associated terminology, existing institutions which characterize themselves as such vary a lot, e.g. with regard to the available infrastructure, the underlying didactical concept and the level of realism. Understanding this broad range, characterizing single institutions and comparing those with one another is eased by description models. Within the third-party funded “Network of Innovative Learning Factories (NIL)” and the CIRP CWG “Learning Factories for future oriented research and education in manufacturing”, a new classification scheme for Learning Factories has been developed and tested. It intends to represent elements and features holistically. Due to the large numbers of institutions involved in the process, the result also claims a high degree of universal validity.

LEARNING FACTORIES FOR EXPERIENTIAL AND PROBLEM-BASED LEARNING IN THE MANUFACTURING DOMAIN

In the past, traditional teaching methods that have been applied in the manufacturing domain were not sufficient to meet the demands of the rapidly changing environments due to inadequate implementation and transfer effects for the manufacturing target groups (Abele & Reinhart, 2011). To avoid the obstacle of trainings being too abstract and far away from real manufacturing problems, manufacturing appropriate learning environments have been created in which self-learning processes can be initiated and moderated. In recent years, this approach has been implemented in industry and academia in form of learning factories (Abele et al., 2015). Depending on the perspective, learning factories are

- highly complex learning environments that allow a high-quality, self-contained competency development (teaching learning perspective) or

- idealized replicas of industrial value chain sections in which informal, non-formal and formal learning can take place (operational perspective) (Tisch, Hertle, Abele, Metternich, & Tenberg, 2015).

(Abele et al., 2015) give a short overview of the history of the Learning Factory approach from the early implementations at the Penn State University (Jorgensen, Lamancusa, Zayas-Castro, & Ratner, 1995; Lamancusa, Jorgensen, & Zayas-Castro, 1997; Lamancusa, Zayas, Soyster, Morell, & Jorgensen, 2008) over new Learning Factory variations especially in Europe (Abele, Cachay, Heb, & Scheibner, 2011; Wagner, AlGeddawy, ElMaraghy, & Müller, 2012) to the establishment of the Initiative of European Learning Factories (founded in 2011), the Network of innovative Learning Factories (NIL, worldwide, founded in 2013, funded by the German Federal Ministry of Education and Research through the German Academic Exchange Service (DAAD)) and the CIRP Collaborative Working Group on “Learning Factories for future oriented research and education in manufacturing” (CIRP CWG, worldwide, started in 2014). The understanding of the system Learning Factory in this article is based on discussions inside and the first results of the CIRP CWG on Learning Factories (Abele et al., 2015). The detailed description model presented in section 3 is developed in close cooperation with the NIL and the CIRP CWG.

EXISTING DESCRIPTION MODELS

Several classification and description models have been disseminated for the purpose of allowing a feature-based delineation of learning factories during the last three years (Initiative on European Learning Factories, 2012; Steffen, Frye, & Deuse, 2013b; Tisch et al., 2013; Wagner et al., 2012). They primarily use the heuristic procedure of morphologic analysis and either focus on particular technical aspects or at least hide out the didactical and pedagogical dimension.

Great asset of the morphological analysis (Zwicky, 1966, 1989) as a method for describing complex systems such as a Learning Factory is the integration of all significant features and characteristics and their potential attributes (Metternich, Abele, & Tisch, 2013). Thus, a picture of learning factories both holistic and generic can be drawn while at the same time a particular Learning Factory can be classified, allowing a simplified illustration of the correlations between all existing options to conceptualize a Learning Factory and the specific design of the actual Learning Factory that is being analyzed.

(Steffen et al., 2013b) present a morphology-based model that covers three contentual dimensions: operation model, target group/metrics and equipment. Thereby, the model is able to also describe framework conditions and information that do not necessarily concern the actual capability building process.

Additionally, (Steffen, Frye, & Deuse, 2013a) appended a didactics-focused description model that is making use of the same technique, but systemizing targets and contents of teaching and learning processes, design of the teaching situation and the organizational framework.

(Wagner et al., 2012) developed a classification tool for learning factories based on a decision table that retrieves information solely regarding the changeability of learning factories. It distinguishes between first- and second-order parameters: The first-order parameters prove if a certain change-enabler is true to the Learning Factory. If that is the case, the second-order level describes how this change-enabler is realized technically.

(Tisch et al., 2013) show a comparatively compact typology displaying a variety of Learning Factory parameters as the result from a survey of ten institutions that are part of the European Initiative on Learning Factories.

LEARNING FACTORY MORPHOLOGY

The developed description model of this paper is based on the definition and the dimensions of learning factories identified in (Abele et al., 2015):

- Operating Model
- Purpose and targets
- Process
- Setting
- Product
- Didactics
- Metrics

Since learning factories are evolving further as a result of new research findings in the educational context or due to emerging technology that has an impact on training needs, also description models need to be adapted or even extended constantly. Therefore, the CIRP CWG on learning factories as well as the project Network of Innovative Learning Factories (NIL), at the same time developed and validated a multi-dimensional description model. It can serve as an orientation in the design of a new Learning Factory as well as a tool for delineation of existing learning factories. As a compilation of features and characteristics that represent an academic consensus, the description model has a direct effect towards further standardization of the Learning Factory idea. Basically,

learning factories are developed based on an underlying purpose through intended definition of curricula, equipment and a didactic model. For the description model developed, 59 single characteristics in seven dimensions were identified. Then, respective attributes have been developed and elaborated for each.

Part 1: Operating Model

Today's learning factories are mainly operated by academic institutions (Abele et al., 2011; Hummel, Schuhmacher, & Ranz, 2014; Reinhart, Schnellbach, Hilgert, & Frank, 2013; Sihn & Jäger, 2012) or profit-oriented operators, namely consulting firms (Hammer, August, 28th, 2014) and big industrial companies (mainly in the automotive industry (Herrmann & Stäudel, 2014; Oberthuer, 2013; Werz, 2012), but also in other sectors (Wüst, 2011)). In the non-profit oriented sector, a variation of the Learning Factory concepts is common in vocational schools (Zinn, 2014).

To operate a Learning Factory, it is not sufficient to have the sole Learning Factory equipment. Learning Factories create values in developing competencies over all hierarchy levels along the value chain in various technological and organizational fields. In order to not only built-up, but also continuously operate and improve the Learning Factory, it has to be linked with a sustainable operational model including financial, personnel and thematic quality/sustainability.

Learning factories must be financed initially (to build up the facility) and continuously (to enable the ongoing operation of the Learning Factory). For both types, internal, public and third party (company) funds from short to long term funding are possible for learning factories. As an important form of financing training programs can be offered on the market in open models (club model or course fees) or can be designed for individual companies.

Personal and organizational aspects play an important role in the quality of the Learning Factory concept. In addition to the technical expertise the Learning Factory staff requires didactic competence for the development and the moderation of trainings or the coaching of trainees. Suitable personnel (research assistants, engineers, etc.) must be recruited and developed.

1.1	operator	academic institution			non-academic institution				profit-oriented operator		
		university	college	BA	vocational school / high school	chamber	union	employers' association	industrial network	consulting	producing company
1.2	trainer	professor		researcher		student assistant		technical expert / int. specialist		consultant	education-alist
1.3	development	own development			external assisted development			external development			
1.4	initial funding	internal funds			public funds			company funds			
1.5	ongoing funding	internal funds			public funds			company funds			
1.6	funding continuity	short term funding (e.g. single events)			mid term funding (projects and programs < 3 years)			long term funding (projects and programs > 3 years)			
1.7	business model for trainings	open models					closed models (training program only for single company)				
		club model		course fees							

Figure 1: Learning Factory morphology part 1: Operating model

Part 2: Purpose and targets

In order to classify a system as "Learning Factory", learning in some sense has to be part of the concept. Following this, either education and/or vocational training (learning in the sense of competency development) and/or research (learning in the sense of innovation) is/are the main purpose(s) of a Learning Factory. As additional secondary purposes industrial production, demonstration and technology transfer, advertisement for production and testing are possible.

For the education and training various target groups in heterogeneous or homogeneous constellation and targeted industries may be addressed in learning factories. Also numerous fields of subject relevant learning content can be identified in existing learning factories, for an overview see also (Micheu & Kleindienst, 2014).

2.1	main purpose	education			vocational training				research							
2.2	secondary purpose	test environment / pilot environment				industrial production		innovation transfer		advertisement for production						
2.3	target groups for education & training	pupils	students			employees							entrepreneurs	freelancer	unemployed	open public
			bachelor	master	phd students	apprentices	skilled workers	semi-skilled worker	unskilled	managers						
										lower mgmt	middle mgmt	top mgmt				
2.4	group constellation	homogenous				heterogenous (Knowledge level, hierarchy, students+employees, etc.)										
2.5	targeted industries	mechanical & plant eng.		automotive		logistics		transportation		FMCG		aerospace				
		chemical industry		electronics		construction		insurance / banking		textile industry		...				
2.6	subject-rel. learning contents	prod. mgmt & org.	resource efficiency	lean mgmt	auto-mation	CPPS	work system design	HMI	design	Intralogistics design & mgmt		...				
2.7	role of LF for research	research object						research enabler								
2.8	research topics	production management & organization		resource efficiency	lean mgmt.	auto-mation	CPPS	change-ability	HMI	didactics	...					

Figure 2: Learning Factory morphology part 2: Purpose and targets

Part 3: Process

In the third dimension “Process” of the description model potential system boundaries of learning factories regarding the product, factory, technology and order lifecycle (Bauernhansl et al., 2014) are described. Furthermore processes and functions are described in detail regarding the material flow, the process type, manufacturing organization, the degree of automation, manufacturing methods and technology.

3.1	product life cycle	product planning	product development	product design	rapid prototyping	manufacturing assembly logistics	service	recycling
3.2	factory life cycle	investment planning	factory concept	process planning	ramp-up		maintenance	recycling
3.3	order life cycle	configuration & order	order sequencing	production planning and scheduling			picking, packaging	shipping
3.4	technology life cycle	planning	development	Virtual testing			maintenance	modernization
3.5	indirect functions	SCM	sales	purchasing	HR	finance / controlling		QM
3.6	material flow	continuous production				discrete production		
3.7	process type	mass production	serial production		small series production		one-off production	
3.8	manufact. organization	fixed-site manufacturing	work bench manufacturing		workshop manufacturing		flow production	
3.9	degree of automation	manual		partly automated / hybrid automation		fully automated		
3.10	manufact. methods	cutting	trad. primary shaping	additive manufact.	forming	joining	coating	change material properties
3.11	manufact. technology	physical		chemical			biological	

Figure 3: Learning Factory morphology part 3: Process

Part 4: Setting

The dimension “Setting” describes the represented learning environment and its features. The original idea behind the learning factories involves a physical factory environment where participants can experiment and explore. Here life-size and scaled-down (miniaturized) factory environments are observed, see e.g. (Abele, Tenberg, Wennemer, & Cachay, 2010; Festo Didactic, 2014). In addition to this, learning processes can involve

virtual and digital representations of value adding chains (Sivard & Lundholm, 2013). The Learning Factory concept also enables good opportunities for blended learning programs, where the physical Learning Factory serves as an application scenario and a place where participants can meet (Tisch et al., 2015).

According to the definition, a Learning Factory includes more than one single work station (Abele et al., 2015) – a whole factory (or even a factory network) may be part of the learning environment. Flexibility and changeability are important requirements for this factory environment since trainees must be able to remodel it. Like in a regular factory IT-support is possible before (CAD, CAM, etc.) and after (ERP, MES, etc.) the start of production (SOP) as well as after the production phase (CRM, PLM).

4.1	learning environment	purely physical (planning + execution)	physical LF supported by digital factory (see line "IT-Integration")		physical value stream of LF extended virtually	purely virtual (planning + execution)
4.2	environment scale	scaled down			life-size	
4.3	work system levels	work place	work system		factory	network
4.4	enablers for changeability	mobility	modularity	compatibility	scaleability	universality
4.5	changeability dimensions	layout & logistics	product features	product design	technology	product quantities
4.6	IT-integration	IT before SOP (CAD, CAM, simulation)		IT after SOP (PPS, ERP, MES)		IT after production (CRM, PLM...)

Figure 4: Learning Factory morphology part 4: Setting

Part 5: Product

The product is a functional instrument in every Learning Factory and has to support the knowledge transfer through its inherent characteristics. In contrast to the regular product design process, the product used in a Learning Factory is either chosen intendedly from existing products on the market or is even developed specifically for the objected use (Metternich, Abele, & Tisch, 2013; Tisch et al., 2015; Wagner, AlGeddawy, ElMaraghy, & Müller, 2014). For this particular case, (Wagner et al., 2014) provide a development procedure for Learning Factory products. The product has an impact on the complexity of learning scenarios and their duration. It is also one driver of operational costs and affects efforts for maintaining and administering a Learning Factory. While most Learning Factories use dismountable products for repeated usage, some facilities also merchandise the Learning Factory production output after trainings, see e.g. (Kreimeier et al., 2014).

5.1	materiality	material (physical product)				immaterial (service)	
5.2	form of product	general cargo				bulk cargo	
5.3	product origin	own development		development by participants		external development	
5.4	marketability of product	available on the market	available on the market but didactically simplified		functional, could be available on the market		without function/ application, for demonstration only
5.5	no. of different products	1 product	2 products	3-4 products	> 4 products	flexible, developed by participants	acceptance of real orders
5.6	no. of variants	1 variant	2-4 variants	4-20 variants	...	flexible, depending on participants	determined by real orders
5.7	no. of components	1 comp.	2-5 comp.	6-20 comp.	21-50 comp.	51-100 comp.	> 100 comp.
5.8	further product use	re-use / re-cycling	exhibition / display		give-away	sale	disposal

Figure 5: Learning Factory morphology part 5: Product

Part 6: Didactics

An integral component of every Learning Factory concept is “Didactics”. Beyond describing the learning outcomes and competence classes addressed, the methods used and the surrounding conditions to achieve those outcomes are detailed. Although learning factories per definition focus on action-oriented, also teacher-centered teaching methods may be incorporated in the overall concept. It should be kept in mind, that competencies generally are developed in an alternation of thinking and doing, while both elements are essential (Aebli, 1994).

6.1	competence classes	technical and methodological competencies	social & communication competencies	personal competencies	activity and implementation oriented competencies		
6.2	dimensions learn. targets	cognitive		affective		psycho-motorical	
6.3	learn. scenario strategy	instruction	demonstration	closed scenario	open scenario		
6.4	type of learn. environment	greenfield (development of factory environment)			brownfield (improvement of existing factory environment)		
6.5	communication channel	onsite learning (in the factory environment)			remote connection (to the factory environment)		
6.6	degree of autonomy	instructed		self-guided/ self-regulated		self-determined/ Self-organized	
6.7	role of the trainer	presenter	moderator		coach	instructor	
6.8	type of training	tutorial	practical lab course	seminar	workshop	project work	
6.9	standardization of trainings	standardized trainings			customized trainings		
6.10	theoretical foundation	prerequisite	in advance (en bloc)	alternating with practical parts	based on demand	afterwards	
6.11	evaluation levels	feedback of participants	learning of participants	transfer to the real factory	economic impact of trainings	return on trainings / ROI	
6.12	learning success evaluation	knowledge test (written)	knowledge test (oral)	written report	oral presentation	practical exam	none

Figure 6: Learning Factory morphology part 6: Didactics

Part 7: Metrics

Ultimately, a metrics section describes quantitative figures easily ascertainable such as floor area size, average number of participants per trainings or the number of full time researchers assigned to the Learning Factory. It is supposed to give the user of the description model better vivid perception of physical and operational extent of the Learning Factory analyzed.

7.1	no. of participants per training	1-5 participants	5-10 participants	10-15 participants	15-30 participants	>30 participants		
7.2	no. of standardized trainings	1 training		2-4 trainings		5-10 trainings		> 10 trainings
7.3	aver. duration of a single training	< 1 day	1-2 days	3-5 days	5-10 days	10-20 days	> 20 days	
7.4	participants per year	< 50 participants	50-200 participants	201-500 participants	501-1000 participants	> 1000 participants		
7.5	capacity utilization	< 10%	10 – 20%	21 – 50 %	51 – 75 %	76 – 100 %		
7.6	size of LF	< 100 sqm	100 – 300 sqm	300-500 sqm	500-1000 sqm	> 1000 sqm		
7.7	FTE in LF	< 1	2-4	5-9	10-15	> 15		

Figure 7: Learning Factory morphology part 7: Metrics

RESULTS AND OUTLOOK

The presented description model, compiled by seven morphological boxes, integrates all scope areas relevant for characterizing a Learning Factory for education in the manufacturing domain. Through the high number of involved partners in the international development and testing process, it can not only be considered the most comprehensive description model for learning factories existing, but also the most generally accepted. Thereby, it is a contribution towards standardization and standard assurance in the Learning Factory context. Since further dissemination of the Learning Factory concept and thereby the set-up of new facilities are expected in the years to come, also some new distinction criteria may arise as a by-product of the evolvement. Thus, this description model is not a static construct but will be questioned consistently with regard to actuality and integrity and updated or expanded whenever necessary.

As a first next step, a web-based platform that allows operators of existing learning factories to assess their concept with the help of the presented morphology will be established. The platform will also serve as an information database for those who seek to identify a facility with certain desired features and thereby facilitate forging new contacts and creating new partnerships for Learning Factory operators and interested parties.

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References

- Abele, E., Cachay, J., Heb, A., & Scheibner, S. (2011). 1st Conference on Learning Factories - May, 19th 2011, Darmstadt. Darmstadt: Institute of Production Management, Technology and Machine Tools (PTW).
- Abele, E., Metternich, J., Tisch, M., Chrysosouris, G., Sihn, W., ElMaraghy, H., Hummel, V., Ranz, F. (2015). Learning Factories for research, education, and training. Key note paper of the 5th International Conference on Learning Factories. *Procedia CIRP*. In Press.
- Abele, E., & Reinhart, G. (2011). *Zukunft der Produktion. [Future of Production]*. Carl Hanser, Munich.
- Abele, E., Tenberg, R., Wennemer, J., & Cachay, J. (2010). *Kompetenzentwicklung in Lernfabriken für die Produktion. [Competency development in Learning Factories for production]*. ZWF, Carl Hanser, Munich, 105(10), 909-913.
- Aebli, H. (1994). *Denken: das Ordnen des Tuns. [thinking: The Organization of Doing]* (2nd edition). Stuttgart: Klett-Cotta.
- Bauernhansl, T., Siegert, J., Groß, E., Dinkelmann, M., Abele, E., Metternich, J., & Reinhart, G. (2014). *Kompetenzbildung in der Wertschöpfung. [Competency building in value creation]*. *Werkstattstechnik online: wt*, 104(104), 776-780.
- Festo Didactic. (2014). *MPS® The Modular Production System*. Retrieved from <http://www.festo-didactic.com/int-en/learning-systems/mps-the-modular-production-system/?fbid=aW50LmVuLjU1Ny4xNy4yMC41ODU>
- Hammer, M. (August, 28th, 2014). Making operational transformations successful with experiential learning. CIRP. CIRP Collaborative Working Group on Learning Factories, CIRP General Assembly, Nantes, France.
- Herrmann, S., & Stäudel, T. (2014). Learn and experience VPS in the BMW Learning Factory. *Proceedings of the 4th Conference on Learning Factories*. Stockholm, 28.05.2014., 1-18.
- Hummel, V., Schuhmacher, J., & Ranz, F. (2014). *Kollaborative Arbeitssysteme in der ESB Logistik-Lernfabrik. [Collaborative work systems in the ESB logistics Learning Factory]*. *Proceedings 15. Tage des Betriebs- und Systemingenieurs (TBI '14)*, Technische Universität Chemnitz, 6.-7. November 2014, 525-535.
- Initiative on European Learning Factories. (2012). *General Assembly of the Initiative on European Learning Factories*. Vienna.
- Jorgensen, J. E., Lamancusa, J. S., Zayas-Castro, J. L., & Ratner, J. (1995). *The Learning Factory: Curriculum Integration Of Design And Manufacturing*. *Proc. of the Fourth World Conference on Engineering Education*, 1-7.
- Kreimeier, D., Morlock, F., Prinz, C., Krückhans, B., Bakir, D. C., & Meier, H. (2014). *Holistic learning factories - A concept to train lean management, resource efficiency as well as management and organization improvement skills*. *Procedia CIRP* 17, 184-188.
- Lamancusa, J. S., Jorgensen, J. E., & Zayas-Castro, J. L. (1997). *The Learning Factory—A New Approach to Integrating Design and Manufacturing into the Engineering Curriculum*. *Journal of Engineering Education*, 86(2), 103-112. doi:10.1002/j.2168-9830.1997.tb00272.x

- Lamancusa, J. S., Zayas, J. L., Soyster, A. L., Morell, L., & Jorgensen, J. (2008). The Learning Factory: Industry-Partnered Active Learning - 2006 Bernard M. Gordon Prize Lecture. *Journal of Engineering Education*, 97(1), 5–11.
- Metternich, J., Abele, E., & Tisch, M. (2013). Current activities and future challenges of the Process Learning Factory CiP. In G. Reinhart, P. Schnellbach, C. Hilgert, & S. L. Frank (Eds.), *Proceedings 3rd conference on Learning Factories*. May 7th, 2013 (pp. 94–107). Augsburg.
- Micheu, H.-J., & Kleindienst, M. (2014). Lernfabrik zur praxisorientierten Wissensvermittlung. [Learning Factory for the practice-oriented knowledge transfer]. *ZWF, Carl Hanser, Munich*, 109(6), 403–407.
- Oberthuer, C. (2013). Integration of Process Simulations into the CIP of Energy Efficiency at Daimler Trucks. In G. Reinhart, P. Schnellbach, C. Hilgert, & S. L. Frank (Eds.), *3rd conference on Learning Factories*. May 7th, 2013 (pp. 38–47). Augsburg.
- Reinhart, G., Schnellbach, P., Hilgert, C., & Frank, S. L. (Eds.). (2013). *3rd conference on Learning Factories: May 7th, 2013*. Augsburg.
- Sihn, W., & Jäger, A. (Eds.) 2012. *2nd Conference on Learning Factories - Competitive production in Europe through education and training*.
- Sivard, G., & Lundholm, T. (2013). XPRES - a digital learning factory for adaptive and sustainable manufacturing of future products. In G. Reinhart, P. Schnellbach, C. Hilgert, & S. L. Frank (Eds.), *3rd conference on Learning Factories*. May 7th, 2013 (pp. 132–154). Augsburg.
- Steffen, M., Frye, S., & Deuse, J. (2013a). "The only source of knowledge is experience". Aachen: TeachING-LearnING.EU, 117–129.
- Steffen, M., Frye, S., & Deuse, J. (2013b). Vielfalt Lernfabrik. [Learning Factory variety]. *Werkstattstechnik online: wt*, 103(3), 233–239.
- Tisch, M., Hertle, C., Cachay, J., Abele, E., Metternich, J., & Tenberg, R. (2013). A Systematic Approach on Developing Action-oriented, Competency-based Learning Factories. *Procedia CIRP* 7, 580–585.
- Tisch, M., Hertle, C., Abele, E., Metternich, J., & Tenberg, R. (2015). Learning factory design: a competency-oriented approach integrating three design levels. *International Journal of Computer Integrated Manufacturing*. doi:10.1080/0951192X.2015.1033017
- Wagner, U., AlGeddawy, T., ElMaraghy, H., & Müller, E. (2012). The State-of-the-Art and Prospects of Learning Factories. *Procedia CIRP* 3, 109–114.
- Wagner, U., AlGeddawy, T., ElMaraghy, H., & Müller, E. (2014). Product Family Design for Changeable Learning Factories. *Procedia CIRP* 17, 195–200.
- Werz, F. (2012). Excellent Qualified and Trained Employees: The Key for the successful Implementation of Lean Production. In W. Sihn & A. Jäger (Eds.), *2nd Conference on Learning Factories - Competitive production in Europe through education and training* (pp. 106–123).
- Wüst, F. (2011). Operational Excellence (OPEX) in der pharmazeutischen Industrie. [Operational Excellence in the pharmaceutical industry]. *Swiss Pharma*, 33(1-2), 5–11.
- Zinn, B. (2014). Lernen in aufwendigen technischen Real-Lernumgebungen. [Learning in sophisticated and authentic technical learning environments]. *Die berufliche Schule*, 66(1), 23–26.
- Zwicky, F. (1966). Entdecken, Erfinden, Forschen im morphologischen Weltbild. [Discovering, Inventing, Researching in the Morphological World View]. Munich: Droemer Knauer.
- Zwicky, F. (1989). Morphologische Forschung. [Morphological research]. *Schriftenreihe der Fritz-Zwicky-Stiftung: Vol. 4*. Glarus: Baeschlin.

Let's Write On The Wall: Virtual Collaborative Learning Using Padlet

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ABSTRACT

Technology has made its presence felt in the classrooms since its invention. However, in the past few years, the creations of various Web 2.0 tools and applications have enriched teaching further. These tools that are designed for various purposes improve learners' experiences in the classrooms making learning fun, engaging and relevant. Padlet is one such tool. It is a simple web-application which enables the creation of virtual walls where students and teachers can write on or pin up images or files. This paper reports a small scale study on the use of Padlet in the teaching of Communication Skills. Based on the data collected through qualitative (open-ended) questionnaires, analyses of students' writings on the virtual walls, and observations of students' behavior when Padlet was used in class, it was found that Padlet 1) encouraged the formation of virtual communities where students learned not only from the teacher but also from one another; 2) enhanced learners' engagement with course content and 3) created 'safe' virtual spaces for learning. The qualitative data gathered also uncovered some potential challenges in using Padlet in the classroom. Suggestions are shared for teachers who are interested in incorporating the use of Padlet in their own classrooms.

INTRODUCTION

The prevalence of technology tools among young adults leads many to believe that teaching in the university classrooms should be technologically up-to-date. This results in a dramatic transformation of the university classrooms, and to the processes of teaching and learning and the roles played by university teachers and students. As a result of this transformation, many universities are equipping their classrooms with internet-linked computers which encourages the integration of Web 2.0 tools in teaching. As a result, tertiary teaching is now supported not only by electronic learning platforms (Blackboard, LMS), but also by various Web 2.0 tools (Messenger, Facebook, Twitter, Google Docs, Blogs, Wordle, Padlet, Gloster, Smilebox, PollEverywhere, and Clickers, to name a few).

Studies have shown that the integration of these technology tools in the classrooms could improve student engagement (William & Chinn, 2009); increase students' participation (Sweeney & Ingram, 2001); "enhance classrooms and learning in meaningful and sustainable ways" (VanSlyke-Briggs, Hogan, Waffle, and Samplaski, 2015, p.139), and improve students' understanding of complex concepts (Smith, 2010). Some findings on the use of technology tools in teaching and learning, however, have not been encouraging. A study by Park (2013, p. 52) on the potential of four Web 2.0 tools to promote reading engagement, for example, shows that even though the tools used made students become more involved in course reading "to a greater extent", they do not guarantee "every student's deep engagement in course readings". Another study conducted by McCabe and Meuter (2011) on students' view of technology used in the classroom shows that even though students enjoyed the use of different technology tools in learning Management, they did not "see the tools as highly effective at enhancing their learning" (p. 149). A study conducted by Clarke III, Flaherty and Mottner (2001) also revealed similar findings: students had differing opinions on the impact of different technology tools on their overall learning. Specifically, they found that even though students' involvement in chat rooms and electronic discussion groups contributed to their participation grade, they found that students perceived these two tools as having nonsignificant impact (Clarke III, Flaherty and Mottner, 2001). The findings in these studies show that even though the use of technological tools are prevalent among young adults, students' perception of these technology tools as teaching or learning tools were not often positive. In fact, many studies seemed to report that students' perception on the use of technology tools in teaching in the context of higher education often varied. More importantly, the findings of these studies support McCabe and Meuter's suggestion to "explore whether technology truly enhance student learning" (2011, p. 150). This is because despite an abundance of research conducted to understand the impact of technology/ web tools on learning, the functions of these tools in enhancing students' learning remains obscure.

The present paper, which explored the use of Padlet, a web 2.0 tool, in the teaching of Communication Skills would contribute to the present literature as it sought to understand how students perceived Padlet as a tool for learning. In trying to understand its use in the Communication Skills classroom, it also sought to explore the challenges that students faced in using Padlet. Padlet is a 'free' web tool which enables the creation of virtual

walls. Virtual walls function like a white board where words could be written on or a notice board where images or files can be ‘pinned up’. The creator of the walls have total control over the content, design and layout of the walls. He or she can also choose to make the walls public or private simply by making changes to the privacy setting. To make the walls exclusive to only specific viewers, the creator of the wall could invite the viewers or set a password. The creator of a wall can also control what visitors can do on the wall, either view, write or moderate others’ work. What is written or uploaded on a wall remains on it unless removed by the creator. Like any other web tools, Padlet walls can be accessed when there is internet connection.

The use of Padlet in the classrooms has been quite well publicized. Many videos have been uploaded on YouTube which explain the many different ways Padlet can be used. Many teacher bloggers and educational websites have also reported the use of Padlet in teaching and learning in different classrooms. So far, however, there has been no reported study which shares the impact of Padlet on students’ learning and very little is known of students’ perception of its use in the teaching of a specific subject. This study thus supports the need for more research in the area as it increases knowledge and understanding of the function or impact of another Web 2.0 tool (in this case Padlet) on teaching and learning.

THE STUDY

In the current study, Padlet was used for the teaching of Communication Skills. Communication Skills is a concept and skill-based course that is compulsory for second-year Degree students. In the Communication Skills classroom, Padlet was used for different purposes: 1) to carry out quick surveys 2) to check students’ understanding of the communication concepts that they had learnt, and 3) to provide students with practice in answering case study and examination questions. Padlet walls have to be prepared before students could access them.

To gain access to a wall, students were required to access their E-learn Blackboard to obtain the address (the URL) of the wall. Provided there is internet access, clicking on the URL would bring the student to the Padlet website. As the walls created are not made public, students could only gain access to the wall when they had keyed in a password which the teacher had provided earlier.

Sometimes, tasks on Padlet were done as part of class activity. When this was the case, all students were required to respond to the Padlet task prepared. Supplementary activities on Padlet that were to be completed outside of class time were made optional; it was left up to the students to complete the activities. There was no set time limit for students to respond to the supplementary activities given on Padlet. This flexibility was given to encourage students to complete the Padlet tasks. The teacher would respond to the answers given by her students, by writing her comments, underlining parts of her students’ answers that were unclear or inaccurate, and by giving students scores for their answers. She would also praise her students for correct responses and if the answers given did not receive full score or was inaccurate, she would encourage them to resubmit their answers for rechecking. Often, the teacher would remark work that students had resubmitted. Regardless of whether it was a class or supplementary activity, when responding to a task on Padlet, students were given the choice to use either their own name, a pseudonym, or to simply remain anonymous. Students were also given the choice to complete the tasks on the walls either individually or in groups. On the walls, however, students were only allowed to write their answers or responses and to view other students’ work. They cannot moderate or make changes to others’ work.

The current study explored the use of Padlet in the Communication Skills classroom. It attempted to understand students’ perception on the use of Padlet as a learning tool and the challenges that students faced in using Padlet. Two research questions guided the study: 1) how did students perceive Padlet as a tool for learning? and 2) what were the challenges faced by the students in using Padlet? Data for the study was collected over the period of one year. Students who took part in the study were second-year Degree students from four different departments, (Psychology, Business, Computer Studies, and Hospitality and Hotel Management, and Computer Science), who were enrolled in the Communication Skills Course. 83 out of 107 students responded to the qualitative questionnaire.

The study employed a qualitative approach and used three data collection methods to gather information to answer the research questions: They are qualitative questionnaires (open-ended survey questions), analyses of students’ writings on the virtual walls, and observation of students’ behaviour when Padlet was used in class. To understand students’ perception on the use of Padlet as a tool for learning, and the challenges they faced when using Padlet, a qualitative survey questionnaire containing five open-ended questions were distributed. According to Erickson and Kaplan (2000), open-ended survey questionnaire has more advantage over interviews or focused interviews because responses received through such method are often more honest because of its anonymity. Furthermore, open-ended questions can capture “diversity in responses” (Jackson and Trochim,

2002, p. 307) and will “provide a direct view of a respondent’s own thinking” (Roberts et al., 2014, p. 1065). The qualitative questionnaire was distributed after Week 10 of the semester (full semester is 14 weeks), when students had ample time to respond to the walls put up on Padlet by the teacher.

The open-ended survey contained five questions attempted to capture students’ opinions and perception of the following: 1) how they perceive accessing and using Padlet; 2) the reasons why they visited the walls on Padlet; 3) whether Padlet supported their learning of the subject and reasons (why or why not?) 4) the feelings they associated with using Padlet; 5) suggestions for the teacher to improve her use of Padlet; 6) any other comments. Qualitative content analysis, was carried out to make sense of students’ responses to the open-ended questions. According to Hsieh and Shannon (2005), qualitative content analysis is a “research method for the subjective interpretation for the content of text through the systematic process of coding and identifying themes or patterns” (p.1278). In analysing the data from the qualitative questionnaire, these steps were followed: 1) read through the responses to get a good sense of the data, 2) develop categories based on the initial review, 3) assign codes to the responses and place them in the category/categories, 4) recheck the categories, 5) review for major themes; 6) identify major patterns and trends, and 7) write the analysis (Planning Council for Health and Human Services, 2011). To ensure validity of the teachers’ interpretations of the responses, another teacher was selected to review her coding and the conclusions she derived from the process.

Analysis of students’ written responses on Padlet walls, on the other hand, was carried out to understand students’ uses of Padlet, and the ways they responded to the teacher’s questions or prompts. The teacher would visit the pages in which students had written their responses to the given questions or prompts and she would analyse and categorize the different ways students had reacted to the questions and to her comments on their answers.

When Padlet was used in her classroom, the teacher would record her observations of her students’ reactions to the activities she required her students to complete through Padlet. These observations were compiled and data from them were used to triangulate findings from other sources, for example, the open-ended questionnaire, particularly on the challenges students faced in using Padlet and their perceptions of the use of Padlet as a tool for learning.

FINDINGS

Several themes emerged from the analysis of students’ responses to the qualitative questionnaire in order to understand students’ perception of Padlet as a tool for learning. They are: ‘building virtual community’, ‘enhancing engagement’ and ‘creating ‘safe’ virtual classroom for learning’.

The study found that the use of Padlet for the teaching of Communication Skills created a platform for students to share their answers and show their understanding of the communication concepts learnt. Some students described Padlet walls as a “social learning platform” or “a space which allows us to express our opinion...”. The sharing platform on Padlet encouraged the formation of a virtual community. This ‘coincidental’ community which consisted of students and the teacher supported students’ learning of Communication Skills. Even though most students chose to remain anonymous when responding to the questions/prompts given on the walls, students were coincidentally assisting one another in the learning of the subject: “*I could improve how to answer questions by learning from others*”. Even though analysis of students’ responses to the qualitative questionnaire revealed that more students visited the walls to check other students’ answers than to check the feedback given by the teacher, the teacher became part of the community which supported students’ learning. As students could view the feedback given by the teacher to their answers and to the answers posted by others on Padlet walls, students were generally learning from the feedback that they and others’ received: “*I learn from my feedback and other course mates’ feedback*”. The response given by a student below showed evidence of the virtual community (which consisted of the students and the teacher) built through Padlet, which assisted in his learning of Communication Skills:

It (Padlet) is the strongest revision tool for me personally, because I can read the answers students provided, link to the comments the lecturer provided, and learn from the mistakes or good answers that (other) students gave.

This virtual and accidental community built on Padlet even helped in the formation of answer bank for future reference. By responding to the questions given on the walls, students were collaboratively sharing “*all sorts of answers*” which they could “*compare and discuss freely*”. This supported students’ learning as they could see that most of the time, “*there is not only one correct answer. You can have a variety of answer for one question.*” This also supported students’ learning of the subject as the variety of answers given by students increased their

understanding of the subject, as one student reported: *“I can have more examples on the readings and more understanding on each chapter through Padlet”*.

Analysis of students’ responses to the qualitative questionnaire also showed that the use of Padlet supported students’ learning as it helped enhance learner engagement with the subject. It was found that students were continuously engaging with the content of the subject when they responded to the given questions given on Padlet walls after class. The use of Padlet, in other words, helped extend the learning of Communication Skills beyond the context of the physical classroom as aptly described by a student, *“It is like having a class outside of the classroom”*. Furthermore, as Padlet is available on the web 24/7, students had the opportunity to respond to the question at their own time: *“I found that I can try to attempt every single case study question anytime.”* This is a feature on Padlet that was valued by students as ‘interactions’ on the subject between students and the teacher continued *“even outside of the classroom”*. The use of Padlet did not only extend learner engagement on the subject, it also helped students who were absent from classes to engage with the subject content: *“If I miss some classes, at least I can do some exercises on Padlet”*.

Analysis of students’ responses to the qualitative questionnaire also revealed that students found Padlet supportive of their learning because it helped create a ‘safe’ virtual classroom for them. Many students appreciated the fact that they could hide their identity from others, even the teacher, when responding to the given questions on the Padlet walls: *“Lecturer does not know who you are.”* Being able to remain anonymous encouraged them to share their answers on Padlet: *“Anonymity makes me not afraid to provide uncertain answers which in turn help me learn from my mistakes.”* Some students shared that being able to hide their identity reduced the probability of them being judged by others. It made them feel safe to share their answers even when the answers they gave could be wrong as shared by a student: *“I AM ANONYMOUS. So no people will know I write wrong or ridiculous answer”*. The fact that students’ identities could remain hidden on Padlet walls was a feature that improved sharing among the students: *“It is anonymous. Everyone can write their opinions whether it is right or wrong. Thus everyone can learn together.”*

However, not all students found the use of Padlet supportive of their learning. Some students reported that they did not use Padlet much. These students reported that they only visited the walls when Padlet was used during class, when they were preparing for tests, and when they were instructed by the teacher. Furthermore, even though analysis of data from qualitative questionnaire showed that most students perceived Padlet as a supportive tool for learning, its use was not free from problems or challenges. Some students reported that they felt threatened when sharing their answers on Padlet. The use of Padlet was also perceived as “troublesome” for some students due to some technical aspects of its use.

Some students reported that responding to Padlet tasks was a threatening experience. This was despite the fact that they were given the choice to remain anonymous when responding to tasks on Padlet walls. Students related various reasons for feeling threatened. Some of the reasons given were related to their low proficiency in the English language; fear of criticism; fear of sharing the wrong answer; fear of answering questions; and worry that answers given were not good enough. One student related that because of his perceived low ability in the English Language and fear of being criticized by others, he would complete the tasks given on Padlet only when *“we are being forced to answer in class”*. Another students shared that when *“you get it wrong... you are embarrassing yourself”*. Another student shared that she *“was constantly worried that my answer was not good enough.”* In fact, one of the students who responded to the qualitative questionnaire shared that responding to the tasks on Padlet could *“affect my confidence in writing.”* This showed that students’ perception on Padlet as a tool for learning was not consistently positive. In fact, some students felt that its use could have some adverse impact on their learning.

Not only some students felt responding to Padlet tasks could be threatening to them, some viewed its use as troublesome due to the following reasons: 1) it was difficult to access Padlet walls: *“We have too many links to open- Imail, Elearn, and multiple Padlet links”*; 2) it was difficult to find their post on the walls: *“There are too many posts on the walls, so it is harder to find specific posts”* 3) the arrangement of the posting on the walls can be messy and this could affect readability; 4) it was problematic when viewing the walls through tablets or smartphones: *“small screen experience”*; 5) occasionally there were problems with the Wi-Fi connections: *“Occasionally lag during use”*; 6) it was difficult to differentiate between teacher’s feedback and student’s answer: *“It is really hard to know which one is posted by lecturer”*. Teacher’s observation of students’ behaviour when completing tasks on Padlet during class time proved that students who were accessing Padlet using tabs or smartphones faced more difficulty when they wanted to type their answers on the wall. To write their answers, students had to double tap the wall, and this was observed to be easily done on laptops using either a mouse or the touch pad. Students also complained that sometimes there was a lag in Padlet use during class time. It was observed that there were instances when students gave up on trying to get to a Padlet wall because of

problematic Wi-Fi connection. From these responses, it appeared that Padlet's use became challenging and troublesome particularly when Padlet was used during class. Other troublesome aspects of its use relates to its accessibility, layout of the postings on the walls and differentiating teacher's feedback from students' answers which occurred regardless of whether Padlet tasks were done as class or supplementary.

DISCUSSION

The study found that Padlet was generally supportive of students' learning because it encouraged the formation of a virtual community, enhanced learner engagement with subject content, and created a 'safe' virtual classroom for students. These positive findings show that the use of Padlet could result in a positive impact on students' learning as it made their learning a collaborative process, and it made students more autonomous and less reliant on the teacher. It also showed that the use of Padlet could improve students' processing and connections with subject content as it made them think and continue to 'interact' with knowledge they had learnt even when classes were over. Not only that, the use of Padlet promoted anonymity among students. This reduced students' inhibition on exhibiting their answers to a larger audience which increased sharing regardless of the quality of the answers. This helped make students' learning formative as they built or formed better answers by learning from their mistakes and the mistakes made by others and also from the comments given by the teacher. It also provided students the opportunity to test their knowledge and to improve their understanding of subject matter.

Despite this some students found that the use of Padlet did not affect their learning. Students who shared this opinion were generally students who were not active users of Padlet. This finding was somewhat justifiable as it reflected how Padlet was used in the Communication Skills classrooms. Students' completion of Padlet tasks, other than the Padlet activities done in class, was optional. Doing so seemed to impact some students negatively. This instruction, however, did not seem to impact students who were autonomous and were generally self-motivated. Making the use of Padlet optional, in other words, had varied impact on students thus some students may benefit from its use more than others.

The findings of the study also showed that like any other technology, the use of Padlet has its limitations. Padlet seemed ineffective and burdensome for students who cannot overcome their fears of sharing due to various reasons which appeared to be internal, relating to anxiety and perhaps low self-confidence. Other problems with the use of Padlet appear to be technical relating to aspects of accessibility, connectivity, hardware, layout and readability.

The next section provides some suggestions to improve the use of Padlet in the Communication Skills classroom. These suggestions could also give ideas to other teachers who plan to use Padlet in their classroom.

IMPLICATIONS ON PRACTICE

The findings of this study show that the use of Padlet, generally, received positive feedback from the students. However, to improve its effectiveness, some measures need to be taken. First of all, the teacher decides to continue making the activities on Padlet as optional, particularly when Padlet tasks are given as homework. This is because tasks on Padlet is only one form of support for students' learning of Communication Skills. Students who chose not to be active on Padlet could have their own reasons for doing so. Perhaps, learning through this platform is not their preferred style of learning. What is more important is that keeping it optional can train students to be more independent in their learning.

Some students felt threatened when they were asked to post their answers on Padlet even when their identity was hidden from others. To reduce their anxiety, students will be encouraged to work in groups when completing Padlet tasks regardless of class activities or supplementary ones. This could perhaps make students feel more secure when participating on activities involving Padlet. Students will also be given options to submit their answers privately to the teachers. Being flexible is important as this could improve learner inclusivity. Some students who have a high level of anxiety on sharing their answers publicly, would perhaps feel more secure when they are given the option to submit their work to the teachers privately and this would in some ways support their learning of the subject.

Another aspect on the use of Padlet that needs to be improved is the accessibility of Padlet walls. Previously, students had to access different pages to get to the walls. To simplify this process, all the addresses to the walls will be placed in one page and properly labelled under different chapters. This way, students do not have to go to different pages to retrieve the addresses to the walls. Access to the walls on Padlet would remain password-protected. This is to ensure privacy and exclusivity of access to the walls.

Another challenging aspect of the use of Padlet was the difficulty faced by students in differentiating the teacher's comments and the students' answers. Analysis of different Padlet walls show that the teacher was not

consistent in the font and style used when writing her comments. At times, she would bold her comments but at other times she underlined or italicized them. There were also instances where she did not differentiate her comments from the students' answers. To rectify this problem, the teacher has to ensure that her comments will only be presented in one uniformed way, perhaps only bolding them. This way students could differentiate her feedback from the students' answers.

Many students also complained that their experience using Padlet on tabs and smartphones have been quite troublesome. Students who used laptops, however, seemed to have a better experience. To improve students' experience in using Padlet in class, students will be notified earlier when Padlet is going to be used in class. This will signal to the students that a laptop will be required for a better learning experience when Padlet is in use.

To improve search for specific answers or responses, in the future, the teacher plans to encourage her students to use pseudonyms when submitting their answers on the walls. This way, it will be easier for them to find their answers or specific responses. This may improve their search but at the same time maintaining their anonymity. The layout of the walls will also be fixed to either 'grid' or 'stream' layout and not 'freeform' to improve readability of the Padlet walls.

CONCLUSION

The use of Padlet in the Communication Skills classrooms appears to be perceived positively by students. Even though there were minor glitches and challenges faced when using Padlet for the teaching of Communication Skills, the study proves that Padlet can increase collaboration between students, extend learning beyond the context of the classroom and create a 'safe' virtual classroom where students can test knowledge learnt. The study also proves that Padlet can be used as a form of formative learning tool as students learnt from theirs and others' mistakes and improve their responses based on the comments received from the teacher. In short, the study finds that Padlet is a worthwhile Web 2.0 tool that can impact students' learning in a positive way. The use of Padlet, however, should be explored further in order to understand its full potential as a tool that assists teaching and/or learning.

References

- Clarke III., Flaherty, T.B., & Mottner, S. (2001). Student perceptions of educational technology tools. *Journal of Marketing Education*, 23, pp.169-177.
- Erickson, P. I., & Kaplan, C. P. (2000). Maximizing qualitative responses about smoking in structured interviews. *Qualitative Health Research*, 10, pp. 829-840.
- Hsieh, H., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*. 15(9), pp. 1277- 1288
- Jackson, K. M., & Trochim, W.M. K. (2002). Concept mapping as an alternative approach for the analysis of open-ended survey responses. *Organizational Research Methods* 5(4), pp.303-336.
- McCabe D. B., & Meuter, M. L. (2011). A student view of technology in the classroom: Does it enhance the seven principles of good practice in undergraduate education? *Journal of Marketing Education*. (33)2, pp. 149-159
- Park, S.W. (2013). The potential of Web 2.0 tools to promote reading engagement in a general education course. *Techtrends*. 57(2), pp.46-53
- Planning Council for Health and Human Services, (2011). Steps for Analyzing Responses to Open-Ended Survey Questions [Internet]. Available from: <http://www4.uwm.edu/cuir/resources/upload/Planning-Council-qualitative-analysis-handout.pdf> [Accessed on 12 April 2015].
- Roberts, et al. (2014). Structural topic models for open-ended survey responses. *American Journal of Political Science*. 58(4), pp. 1064- 1082
- Smith, B. (2010). Gazelle, Lion, Hyena, Vulture, and Worm: A teaching metaphor on competition between early and late market entrants. *Marketing Education Review*. 20(1), pp. 9-16
- Sweeney, J. C., & Ingram, D. (2001). A comparison of traditional and web-based tutorials in marketing education: An exploratory study. *Journal of Marketing Education*, 23, pp. 55-62.
- VanSkyle-Briggs, K., Hogan, M., Waffle, J., & Samplaski, J. (2015). School partnerships: Technology rich classrooms and the student teaching experience. *Journal of Educational Technology Systems*, 43(2), p.121-141
- Williams, J., & Chinn, J. S. (2009). Using Web 2.0 to support the active learning experience. *Journal of Information Systems Education*. 20(2), pp.165-174

Malaysian Printing Challenges In Commercial Printing

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ABSTRACT

The printing industry is one of the important industries in Malaysia and has been started almost 200 years. Nowadays, this industry has made tremendous progress in economic growth. The rapid development of technologies and the new trends of consumer requirements make the printing industry face challenges in sustaining business. The objective of this study is to explore the challenges related with survival of the commercial printing companies in Malaysia. A qualitative approach by employing interviews with owner or the top managements from the selected commercial printing companies is employed. The respondents are interviewed from fourteen commercial printing companies. The findings of this study revealed the majority of commercial printing companies in Malaysia do face challenges, rank in the following order, (1) the reduction of printing order, (2) digital printing development era, (3) the adoption of international standards. The identification of the relevant and appropriate factor is hoped to assist commercial printing companies in strategizing their practices to ensure continuous growth in business.

INTRODUCTION

Nowadays, the printing industry globally becomes more competitive in relation with customer demand and the development of technology. The rapid changes and developments in the printing industry make printing sector a more challenging business in which one can venture. The commercial printing is considered as one of the most dominant segment in the printing industry (Thompson, 2013). The survival of the commercial printing segment has been widely discussed (Marketline, 2012; Thompson, 2014; Watkins, 2012). Romano (2015) stated that the commercial printing industry has been declining by 45% in less than 20 years. In addition, if compared to the packaging industry, the sales value is about \$ 800 million in 2013 and projected to increase by 4% per year to 2018 (Henry, 2014). Many studies have shown that the commercial printings are facing with high competitive conditions. Associated with the rapid changes on customer demand and globalization of the digital printing in the printing industry (Thompson, 2014).

The rapid developments in digital printing technology had changed the requirements and customer demands. The changes are currently toward customer demand and preferences are strongly influenced by the development of the internet and social media. According to (Paige, 2013), the printing industry has changed remarkably from a family-owned business based and tradition to a merger with other fields such as marketing plans, variable data, use the web and social media. The scenario has affected the demand activity in the printing industry. It has become a topic of discussion on how is the survival of the commercial printing companies presently and in the future. Graham, Arthur, & Mensah (2014) added the liberalization and globalization are changing the business landscape in printing domestically or internationally.

Studies or white paper were discussed in the context of global and specific countries focusing on the trends, challenges and strategies required among the printing industry to sustain in business (Chung & Jensen, 2011; Hultén, Viström, & Mejtoft, 2009; Lasomboon, 2012; Romano, 2004; Thompson, 2013). However, very limited studies discussed about the issues in Malaysia. Therefore, more in depth studies emphasizing on current printing scenario in Malaysia is required in order to help in enhancing commercial printing companies to strategies for a better performance. This study explored the issues related with the survival of the commercial printing companies in Malaysia, and how this could help to remain competitive and sustain in business .

The Malaysian printing industry is also affected with what is happening in the global development. The Malaysian printing businesses encountered several challenge, in terms of competency in winning the printing project, especially commercial printing segment. This supported by Thompson, (2013) who stated that the commercial printing companies are now struggling to sustain in business. This is due to a trend of consumer is spending their money, for example to purchase retail products, travel and leisure, sports through the internet. The

changing of people spending is affecting the printing demand in printing industry. The people get information and seeing the advertisement through the website would reduce the use of printed matters. Furthermore, Hultén et al., 2009; Lasomboon, (2012) also highlighted the customers put emphasized on price, better quality of product and faster delivery are among the challenges that need to be considered by the commercial printing companies to compete in the market. There is competition between the printers that have prevailing price war in an attempt to get a print job.

The increase of stiff competition in the print market due to the market shrink, the development of digital printing technology and the explosion of the internet changes consumer's purchasing style (Malaysia Printing & Supporting Industries Directory, 2015; Romano, 2004; Thompson, 2013). The rapid development on technologies makes uncertain business condition in the commercial printing industry. Therefore, the printing companies in Malaysia need a new business model in order to face the new trends in customer demand and ready for the world of digital era.

The printing companies is encouraged and not recommended to only depend on the local market where the demand and markets are getting limited (Malaysia Printing & Supporting Industries Directory, 2010). To enter the international markets, the printing companies are required to meet certain requirements such as having a certain international certification or standard. To ensure that customers are satisfied and become their selected printer, printing companies need to prove their capability to produce quality printing works by having certification (Chung & Jensen, 2011). According to the National Printing Equipment Association (NPES) for Suppliers of Printing, Publishing and Converting Technologies (2005), the implementation of the international standard will give positive contributions to printers and the nation as a whole, because the print production will be faster, more efficient and more cost-effective (Chung and Jensen, 2011). One of the effective strategies that has been widely used and proven successful is through the implementation of Total Quality Management (Karthi, 2004). The printing company can introduce the quality program as a movement towards continuous improvement within the organization. Currently, most of printing companies in Malaysia are certified with the popular international standards such as ISO 9000, ISO 14000. However is lesser of printing companies are attempt to obtain international standard certifications that specific to the printing industry for example is ISO 12647. Presently, the use of the international printing standard has become a trend in the printing industries worldwide (Lokhande, 2012; NPES, 2005). This can be supported by a survey that was done by Robert Chung, whom stated that most of the printers involved in the survey had expressed the importance of the printing standards and plans for implementation in the near future (Chung & Jensen, 2011). According to Thaler (2008), in a challenging business environment, in determining the quality, cost and time spend, the standard plays an important factor in contributing towards the success or failure of a company.

Thus, the printing industry in Malaysia should be prepared to face the challenges of the new trends in the printing business. Printing companies should update their technology capabilities, adopt new technologies, modernize equipment, increase production strategies to meet changing demands and remain competitive (Abdullah and Masod, 2012). The Malaysian printing companies need to position and plan new business model and strategies to make them remain competitive and sustain in business. Therefore, this study is worthwhile to understand the scenario that faced by Malaysian printing companies and ideas and data gathered are valuable not only for commercial printing industry but also for education purposes.

METHODOLOGY OF STUDY

This study is confined to the printing companies located in the Klang Valley area. This area was chosen because of the density and volume of the printing activities businesses. The printing companies were chosen based on their printing activities namely commercial printing segment and books which is known as general printing. This printing company mainly offers printing services using an offset lithography printing process. In terms of company size, the chosen printing company comprised of small, medium and large. The printing companies are selected based on their consent and availability to be interviewed. The research methodology used in this study is qualitative approach and the purposive sampling method was employed. To ensure rich and trustworthiness of data collected, the respondents selected are among the owner, managing director or top management staff. According to Miles, Huberman and Saldana, (2014), who states that qualitative data is focused on the experiences of individuals who are in a real situation. They are considered to have a lot of ideas and knowledgeable in providing the information. They were contacted by telephone, short messaging system (SMS), WhatsApp and followed up by email to confirm the appointment before the interviews.

There were fourteen respondents selected from the different printing companies for in-depth interview. The questions that were asked during the interview session were specific in exploring the current challenges faced by the commercial printing companies. In addition, other information is also gathered such as an opinion regarding the management approaches and strategies in facing the current challenges. Averagely the question raised is

based on the un-structural question and take between 45 minutes until one hour. The data was transcribed in Malay, then re-transcribed in English, coded, and analyzed for themes. The Computer Assisted Qualitative Data Analysis Software (CAQDAS) was used to process the data. The selected CAQDAS program used in this study is Atlas.ti 7.1.4. The CAQDAS is considered useful tool to help researcher in analyzing qualitative data through multiple options available (Miles, Huberman & Saldana, 2014). Member-checking procedures with all the informants were done to enhance the trustworthiness of the transcripts.

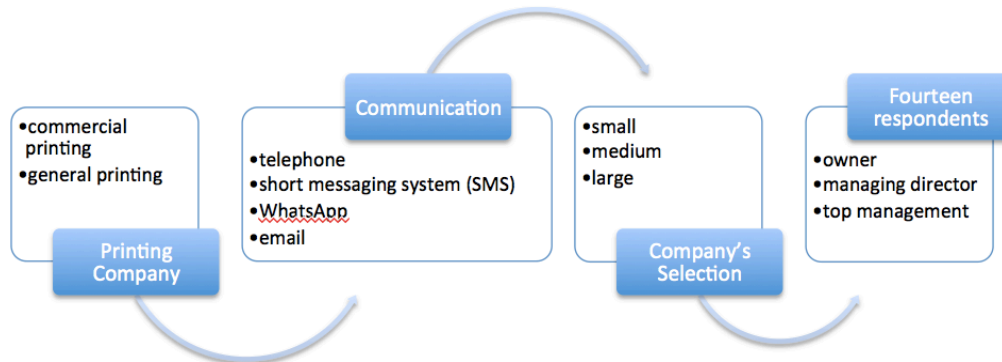


Figure 1. Overview of in-depth interview selection and criteria

RESULT AND FINDINGS

The fourteen respondents are from the different companies and various positions who are participated in this preliminary study. They are Managing Director or owner of the company is seven, senior production manager is four and followed by director of company, marketing manager and head of department where each position is one. They are having vast experience in the commercial printing industry. The respondents share their general opinion about the challenges and developments in the printing business. Twelve of the participants were male and two were females. Most of respondents have experience in printing field is more than ten to twenty years. This is the respond from the participants related to working experience:

“I have been running this business for almost twenty years. I believe that this business is very potential and gave me good businesses” (Managing Director, company J)

“I started this business in 2004, it has been almost ten years. Before this, I've worked with Malindo Press in Shah Alam for several years.” (Managing Director, company L)

“I started printing back in 81, up until now. I started with Tien Wah Press. Studied in Germany and in 83, I went back, and joined Times Offset. Then I joined briefly Ultimate print, for 1 and a half year. At Times Offset for almost 15 years, All the way printing...” (Senior production manager, company B)

There are various sizes of companies that are involved in this preliminary study. The largest number of respondents from the small and medium enterprises (SMEs) is nine people compared to the large company are five. According to the National SME Development Council (NSDC) (2013) was defined for Small and Medium Enterprises (SMEs) in Malaysia. It is based on the annual sales turnover and number of full-time employees. The enterprises which are in the SME category sales turnover is not more than 50 million and the number of full-time employees more than 200 people. The small enterprises means sales turnover is between RM300,000 to 15 million or total full-time employees is between 5 and 75. Meanwhile the medium-sized enterprises means the sales turnover is between RM15 million to RM50 million or full-time employees is between 75 and 200 people.

Therefore based on the study conducted there are three major issues concluded, namely (1) the reduction of printing order, (2) digital printing development era, (3) the adoption of international standards. These issues will be discussed to the rank order of important issues revealed by respondents during the interview session.

1. The reduction of printing order

The printing market changes are related to reduction of quantity has become a major challenge discussed in the printing industry. It is hard to deny the development of electronic media as one of major factor affecting the reduction of printing order mainly in commercial printing segment. For example, the trends of consumers using the internet to purchase online products, the development of e-book in education and the government moves to ICT initiatives which lead towards paperless government. This situation affects the activities and sales growth in commercial printing industry. Therefore, many of printing companies struggling and competing each other in order to get the printing jobs. These quotations were provided to describe the scenario of quantity reduction:

“Nowadays, the main challenge to printers is reduction of printing order”
(Senior production manager, company B)

“Commercial printing is still dropping, for example; broadcasting company gives free copy to their customer. The print quantity is almost 2 million copies but now it was decrease to 300 hundred thousand copies” (Senior production manager, company B)

“latest development, the government has stepped towards the use of high technology in the practice of paperless administration. This means that the printing works from government is going decrease”
(Senior production manager, company C)

“Talking about the title, it is increase, but circulation or volume is drop. For example, previously the ABC magazine, print quantity is around 80 to 90 thousand copies per issue but now it about 35 thousands only. Previously adolescents pride when carried it.” (Senior production manager, company A)

“Magazine Z, printed around 85 thousands using Web. Now it was transfer to sheet fed, no more print on web. For instance, print for ten thousands, waste paper is around two thousand, meaning waste is 20 percent.” (Senior production manager, company C)

“The demand is getting less in the sense of using the book or any printed matter in the form of hard copy. By comparing with the previous time everybody are depending on hard copy but now people are have an option which they can use soft copy.” (Managing Director, printing company F)

Furthermore, the small and medium enterprises (SMEs) are dominant category in the Malaysian printing industry. Some of the SMEs practicing are throwing price where creating price war in the market in order to win the printing jobs from the clients. The scenario occurs because the small and medium enterprises need to survive in business as well as the customers who also put pressure in terms of price. Participants commented on the issue of printing price on the market:

“Price also gives a problem. For example, one company gives offer for RM 1 and another one offer 90 cents. The customer will find the lowest price. They spoil the market which is not healthy”
(Senior production manager, company B)

“Subsequent challenge is price war for getting printing jobs from clients. Sometimes very difficult to understand because the price offered is to low” (Sales manager, company E)

“Products from publication segment have a problem but packaging segment is growing. And we have a plan to get involve in printing segment” (Senior production manager, company I)

“Unfortunately, the scenario in the local printing industry is the occurrence of a price war among printing companies in order to get the printing job. Every printing company try to ensure company’s targets are achieved to make their printing machine and other facilities occupy with printing work activities.” (Managing Director, company F)

The publishing industry is also giving a strong pressure to the commercial printing companies by reducing the number of print order. The rapid development of digital printing technology has given opportunities for the publishing industry to develop a new model in manufacturing book. One of the advantages of digital printing is focus on Print-on-Demand (POD) market. POD means the ability to print even a single copy of book in a short production cycle and time. Based on the conventional model, the publisher will print certain quantity of the publication, then, they will try to sell the books to the market. Currently, the approach has changed, the publisher

does not intend to print book in large volumes. Reduction of print order for books was commented by participant:

“Nowadays, especially book printers facing the problem with the dropping the print orders from publisher or client. Previously, usually for the first print of book the publisher will place order around 5000 copies but today the thing was change where the quantity order is around 2000 to 2500 copies only.” (Managing Director, company F)

“In the current trend also shows the influence of digital printing. This printing process gives the option to publishers and printing companies in order to print the books work. It is associated with a fast print production of job-creating the book from start to completion. The processes involve in book production are less for example to print 1000 copies loose sheet it will take roughly around 15 to 20 minutes. Be more economical for small volume orders. For example, calculation based on the quantity order that are less than 500 copies the printing costs are lower compared to offset printing. Currently, the Digital printing process is mainly for Print-on-Demand (POD) market.” (Managing Director, company F)

The publishers try to reduce or eliminate the storage costs by keeping excessive stock as inventory. For the conventional publishing business the slow movement of book stock will cause tie up the cash flow for the company and lead to retard in business operation. The trend shows that most publishers have towards an approach based on POD or short run book order. The trends of reducing print order that finally gives pressures to commercial printing companies where having problem in excessing of machines capacity. A modern and advance of offset printing machine have a capability to print at the high speed with thousands of impressions or sheets that can be printed in an hour. Therefore, the failure to utilize the maximum capacity of advance offset printing machine would cause commercial printing company struggle to survive in business. The participant also adds some information that associated with the advancement of printing machine technology and reduction of print order:

“In another perspective, printing technology continues to grow by offering printing machine capable of printing up to reach 18,000 impressions per hour but at the same time the number of quantity order on the printing job has decreased. (Managing Director, company F)

“Technological developments such as Print on Demand (POD) that causes market shrink. For example impact on reducing of prints order.” (Managing Director, company N)

2. The development of digital printing

Many commercial printing companies in Malaysia are now integrating offset printing process and digital printing process in their printing businesses. The commercial printing companies make investments for digital technology in order to complement the existing printing process as well as to better serve their customers. This statement that be shared by one of participant:

“Our company also makes investments in buying digital machine in order to fulfill the customer demand. The digital printing exists is to complement existing offset printing process” (Managing Director, printing company E)

They start to understand if they do not take the opportunities on the development of digital printing, they will be left behind. The conventional offset businesses are having weaknesses in term of manufacturing the printing product in a short time and in a small quantity order as low as one copy. The digital printing processes currently are more popular due to its advantages in producing the printing job within short printing cycle, better quality and more cost competitive. The investment in digital equipment by printing company is to improve the quality of products and services. This will provide a competitive advantage to the company in the printing market. Customers in current business trends need a solution from the printing company with innovative ideas, high value, cost effective and concern of environmental issue. Nevertheless, the factors of price, quality and faster delivery are still main consideration of customers. Description given by the participants on developments in digital printing:

“printing industry is a sunset industry, when facing with the internet development. Digital printing will be used to print small quantity printing jobs, for costs saving” (Managing Director, printing company F)

3. The adoption of international standards

The printing industry in Malaysia is more dependent on the local market, gradually embarking the international market. The size of the print product export is still small compared to neighboring countries like Singapore and Thailand. However, efforts are started by the printing companies in Malaysia to penetrate overseas markets. This is supported by one of the participants:

“However, the customers from overseas are more emphasis on quality and give high profit margins compared to domestic customers. Now, the company is trying to focus on the international market. The reasons are a high profit, the large quantity print order as well as a consistency in monthly orders.”
(Senior production manager, company I)

However, in some cases, when local printing companies is to have business with the international market, they are required to be certified in order to be eligible to get the printing jobs or contracts. This regulatory has impacted the local small and medium sized enterprises compared to large companies. Generally from preliminary study concluded the importance of standards highlighted by large printing companies. The large-sized printing companies have clients from abroad and perform for high-quality printing works. Usually, the best quality management practices always implement by large companies compared to small and medium enterprises (SMEs). Generally, the large companies have realized that they will gain the internal and external benefits for organization through the adoption of international standard. The international standard is work as a marketing tool for the company. In addition, the companies will able to increasing the productivity and profitability, motivation for employees, the production under control and efficient quality management. With strong capital lead the large printing companies are able towards ISO certification and quality management practices. Meanwhile, the local SMEs are more focus on local market, instead of international markets. Participants from medium and large printing companies commented on implementation international standard:

“Our company has entered the international market to strengthen its business. To enter the international market by having an international standards accreditation is an advantage to the company. In 2011, our company has been certified for ISO 12647-2 (printing standard) by an international standard of certification bodies. The benefit of certification is give confidence to our company to produce high quality printing. Our production is also able to achieve print quality at 400 lines per inch (lpi), which could not be achieved by most competitors in the market. In addition, our company is able to build the confidence and trust of customers with quality print produced.” (Managing Director, printing company F)

Currently in Malaysian printing industries, there are less commercial printers adopting good quality management and have international standard certification. Even though, the total number of Malaysian companies certified for ISO 9001 are large and continue to increase yearly. However, the printing industry has adopted international standards is unknown. In the context of, international printing standards, currently, there are only four commercial printing companies in the large and medium sized that are certified as a Process Standard Offset (PSO). The fact is, if the printing output produced is still below the standard required, the customer or allied printers are reluctant to give the printing job to any printer that is not capable to produce good printing quality, especially associated with the SMEs printing companies. Some of the medium and large printing companies commented:

“Process Standard Offset (PSO) has grown quite long time, but it still not acceptable in Malaysia. It is involve with many work processes. The adoption is very slow in Malaysia compared to Europe.”
(Senior production manager, company B)

“There are not many book printing companies having the ISO certification. They do not emphasize the international standards that are associated with the nature and practices of printing the book in the context of Malaysia. Local market was also felt that the international standard is not very important in Malaysia. It is quite important and useful for the packaging printing that need the accuracy of the printing color.” (Managing Director, company F)

By having any international certification it would become a stepping stone to a company to move ahead and penetrating oversea market. The international jobs required certain requirements in order to get the job. However, to get international certification, the company needs to invest in term of consultation, training and equipment. Some participants from large printing company gave statement from their experience:

“Nowadays, quality is very important in the market, any problems the customers will get the free copies”

(Senior Production manager, company B)

“To get Process Standard Offset (PSO) certification will involve with costs, need some investment. Therefore, the company try to get the printing jobs that required high quality printing. The customers are willing to pay more.” (Senior Production manager, company A)

The participant from small printing company gave statement from their experience associated with the adoption of international standard:

“Standard certification obtained can be a marketing tool and can make it easier to get printing work from customer. Printing working practices are based on standard is still unfamiliar among the local printer, but it will eventually be implemented by a local printer in the near future.”

(Managing Director, printing company D)

The return on investment will be gained at least three to five years after the implementation. Normally in this case it gives some pressure to small company. Factors such as capital, technology and knowledge always make small and medium companies lagging in the printing market. The large printing jobs usually are secured by large printing companies compared to small companies. Finally, the capital strength and size of the market and existing customers is a determining factor for printing company moving towards the international standard certification.

CONCLUSION

This effort is conducted to bring the printing industry in Malaysia to become more competitive as well as the printing companies can survive in the printing businesses. This research could have an impact on the printing industry in Malaysia. The challenges for current and future in the printing industry needs to be understood precisely for business survival and allow the printing companies to establish new business models. Researches on current trends and challenges should be carried out at the largest setting in the Malaysia context. The results of this study will close the gap of the lack of information regarding the printing industry in Malaysia.

Furthermore, the current business activities should not mainly reduce the price and profit margin, but the most important things are how to attract the customer's attention. The customer's attention can be achieved through the improvement in customer service, produce the better quality product, faster delivery and offering competitive price. Nowadays, the printing company cannot simply provide what customers want. They need to provide more than that, for example able to provide the solution center to the customer, providing ideas that are innovative, offering an efficient and knowledgeable employee. Therefore commercial printing companies are able to deal with the opportunities and threats of globalization business changes.

The emergence and development of digital printing process cannot be denied. The digital printing process has become more popular compared to conventional printing processes such as offset lithography, flexography and gravure. The advantages of digital printing processes such as fast, short production cycle and save costs have put pressure on offset printing process. However, it is becomes a trend where the printing company invests and equips them with the digital equipment and offset machinery. Therefore, it will create opportunity to company in getting biggest market share as well as giving selection of printing services to the customers. The developments in digital printing technology should not be seen as a rival to offset printing. Instead they need to develop a strategy to make both printing processes complement each other. The customers are given the option through the printing processes that offered by the printing company. Therefore, the customer loyalty to the commercial printing company will be sustained.

Meanwhile, the commercial printing company in Malaysia should be prepared to change mindset to develop a new business strategy in line with current developments. For example by accepting international standards in helping companies improves businesses performances and sustain in business. Therefore this indicates that the adoption of international standards can be an important issue to be considered as a strategy for business growth and development. If they do not act to change, the company will face a failure to compete in the global and domestic print market as well as improvement of internal production performances.

This confirmed, the adoption of international standards among printing companies will strengthen and improve the businesses performances. This is also one of the reasons why this study is conducted to help printing companies to be aware of the opportunities and barriers faced effective business performance through adopting the quality management. It not only provides internal benefits to the company even externally impact to the company. Printing company in Malaysia is now working towards producing the better quality print product.

Many of printing companies' usually large size company already embedded the quality program in their business practice compared to SMEs printing companies.

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References

- Abdullah, H and Masod, M. Y. (2012). *Future Trend in Malaysia Printing Technology: Challenges and Prospects. Challenges of Printing Science and Technology towards ASEAN Community*.
- Chung, R & Jensen, S. (2011). *Printing Standards : A 2010 Survey Report*. Rochester, New York. Retrieved from <http://print.rit.edu>
- Henry, P. (2014). The Impact of the Internet on Print. Retrieved June 4, 2015, from www.whattheythink.com
- Hultén, P., Viström, M., & Mejtoft, T. (2009). New printing technology and pricing. *Industrial Marketing Management*, 38(3), 253–262. doi:10.1016/j.indmarman.2008.01.001
- Kartha, C. P. (2004). A comparison of ISO 9000:2000 quality system standards, QS9000, ISO/TS 16949 and Baldrige criteria. *The TQM Magazine*, 16(5), 331–340. doi:10.1108/09544780410551269
- Kingsley Graham, N., Dissou Arthur, Y., & Peprah Mensah, D. (2014). Managerial role in ensuring successful total quality management programme in Ghanaian printing firms. *The TQM Journal*, 26, 398–410. doi:10.1108/TQM-01-2012-0009
- Lasomboon, A. (2012). Trends in Competitiveness of the Thai Printing Industry. *World Academy of Science, Engineering and Technology*, 28–30.
- Malaysia Printing & Supporting Industries Directory 2011/2012. (2010). *Marshall Cavendish Business Information Private Limited*, 1–8. Retrieved from <http://www.printmalaysia.com>
- Malaysia Printing & Supporting Industries Directory 2014/2015. (2015, March). *Marshall Cavendish Business Information Private Limited*, (2014-2015), 2–9. Retrieved from <http://www.printmalaysia.com>
- Malaysian SME Definition. (2013). Kuala Lumpur. Retrieved from http://www.bnm.gov.my/files/2013/sme_cir_028_1_new.pdf
- Marketline. (2012). Global Commercial Printing. Retrieved September 19, 2013, from www.marketline.com
- Matthew B. Miles, Johnny Saldana, A. M. H. (2014). *Qualitative Data Analysis; A Methods Sourcebook* (third Edit.). California: SAGE Publications, Inc.
- Paige, C. (2013). *The Effectiveness of Total Quality Management Principles in the Printing Industry*. California Polytechnic State University.
- Romano, F. J. (2004). *An Investigation Into Printing Industry Trends*. Rochester, NY.
- Romano, R. (2015). *Strategic Partnerships Help Commercial Printers Transition to New Markets*. London, United Kingdom. Retrieved from <http://whattheythink.com/whitepapers/>
- Thaler, K. (2008). Spotlight on the Standards & Norms in the Graphic Arts Industry Publisher. *EFI GmbH*, 1–17.
- Thompson, C. (2013). Challenges for The Printing Industry. Retrieved September 19, 2013, from www.cavendish_mr.org.uk
- Thompson, C. (2014). Challenges for the Printing Industry Globally in 2014. Retrieved March 4, 2015, from <http://www.ceo-worldwide.com/ceobulletin.php?num=59>
- Watkins, D. (2012). *Factors Contributing to the Success of Commercial Printers*. Rochester Institute of Technology.

Measuring Students' Attention By Distribution Of Attention Test And Bourdon's Attention Test

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ABSTRACT

The goal of this study was to measure the level of attention among students in upper secondary education by Attention distribution test (ADT). To verify the measurements, respondents of the research were presented with Bourdon's cross-out test (BCOT) in Prague squared modification. Using Pearson correlation coefficient we verified the degree of relationship between the Attention distribution test and the standardized attention test, Bourdon's cross-out test. The research sample consisted of $n = 134$ and the correlation coefficient $r = 0,455$ confirmed moderately strong correlation between the results of BCOT and ADT. We can recommend the Attention distribution test to the teachers as a quick diagnosis of students' attention level.

INTRODUCTION

The quantity and quality incentives which the individual must process have changed and natural adaptive capacity of man is daily exposed to the increased pressure, "the door to the soul" is wide open and sometimes there is great draft. However, individual psycho-regulators whose rate and strength varies in different individuals, allow to cope with these stimuli pressures. Special place among them occupies attention as the psychological quality of man that forms the basis of many effective capabilities of man. On the one hand, attention strengthens (or in the event of insufficiency it inhibits) natural adaptive capacity, on the other hand, it is a prerequisite for effective and creative input into the outside world (Cabanová, 2013).

THE STUDY

Attention:

In the broad sense of the word, attention covers all mental activities from "noticing" something to the concentrated observation of something. All that objects, events or activities that we pay attention to, have in common is that for a certain period of time they become the focus of mental events. This "central location" makes the objects, phenomena or activities to which the attention is directed, becoming clearer and clearer and they dominate more over other currently ongoing mental, behavioral or real actions or events.

Attention can be understood in at least two ways:

1. as a term expressing or outlining certain current state of organism readiness to mental or behavioral act,
2. as the current level of "vigilance" or excitation (arousal) of psychological or somatic activity.

The current level of attention acts as a selective factor that determines which of the operating incentives come into consciousness and trigger an appropriate response (Cabanová, 2013). Plháková (2003, p.77) aptly puts it when she writes that "attention is a mental process, the function of which is to inject into the consciousness the limited amount of information and to protect it against "overloading " with plenty of incentives currently and realistically acting on the man ".

Attention, however, does not only mean the focus of mental activity acting on the initiative, but it also expresses particular state of consciousness. This state of consciousness is characterized by a certain degree of clarity and explicitness of perceived objects in consciousness. Therefore, attention can be understood as a general feature of consciousness, presenting itself as conscious deployment of mental functions in order to bring these functions to the highest degree of performance. So if we understand attention as a mental state that manifests itself in the directedness and concentration of consciousness (Chalupa, 1981), we must take into account the fact that the mental activity of a person varies over time in intensity, it has a fluctuating character and determines the current level of performance.

Under the concentration of consciousness we most often understand the degree of activity of mental act, which is usually referred to as the intensity of attention. As the degree of intensity of attention we consider the current degree of awareness of somatic or mental activities, while we mean those activities that take place on a conscious level. The more intense is the concentration of consciousness, the clearer we reflect on our experience or behavior. Of course, these processes are taking place at an unconscious level, which means that the regulation and control of behavior has its off-conscious attributes. In the area of attention we are most often moving at the level of consciousness, however it does not mean that we have all ongoing mental or behavioral activities constantly under control (Cabanová 2013).

Attention is closely connected with the educational process. Its development itself is driven under the influence of school requirements (Hamranová 2003). It is an important prerequisite for good performance. If underdeveloped it is a common cause of school failure (Svoboda, Krejčířová ,Vágnerová, 2009). The role of

teachers is also to motivate children and adolescents to the education itself Lemešová (2013). Part of these efforts is obviously the need of improving the ability of teachers to master such techniques, which help stimulation the student's attention and especially keeping it during the lesson, as confirmed by Šramová (2004, 2013). According to Smetanová (2012) the importance of attention in learning is seen as unquestionable.

Level of attention is unevenly distributed in the population, somebody had it higher, another lower. The level of attention fluctuates even in one and the same individual - during the day, during different periods of his life. For teacher to recognize whether it is a student with a permanently lower level of attention or his weaker school results are based on different grounds, he must have at hand a suitable and easily serviceable tool to measure the attentional level.

Measuring the level of attention is a problematic issue, because in the tasks that are sometimes referred to as a test of attention, it is not quite possible to distinguish the effect of attention from other mental functions and processes. The most significant level of attention is reflected in the tests, the content of which is to perform relatively simple, stereotypical activities for a longer period of time.

According to Chalupa (1981) it is possible to consider the methods of attention research in the broader sense. Thus, we can distinguish several basic types of tasks: methods of monitoring of mental activity course; methods of conducting two activities; the role of interconnection attention; tachistoscopic method; methods of research of attention in association tasks and to solve the mental tasks; implementation of complex sensorimotor coordination; observation of reversible figures; other methods of attention research .

Research question:

The basic question that stood at the beginning of our research was: Is there a link between variable (value), which are measured by Bourdon's cross-out test, namely the Prague squared modification, and variables that are measured by Attention distribution test? Otherwise and more precisely: do the test result of BCOT and ADT correlate for secondary school students?

Research method:

As appropriate (albeit partial) compensation could serve Attention distribution test (ADT) and Bourdon's cross-out test (BCOT) in Prague squared modification. ADT is a methodology which is based on similar principles as the standard techniques for measuring the level of attention. The author of the original English version of the test is Audley L. (1988) and the Slovak modification was created by I. Brezina and K. Ďuričová- Cabanová (1989). Test has got the verbal nature and it consists of three parts. In the first part respondents select from the ranks those words that begin with the letter "K". In the second and the third part they select both the adjectives and words beginning with the letter "K" (Cabanová, 2009).

Fig. 1 The relationship between variables BCOT score and total score ADT

To assess the size of the Pearson and Spearman correlation coefficient and thus to assess the strength of dependence between variables, we use the scale designed by Jacob Cohen, who assessed the results of

psychological research as follows: Correlation (in absolute value) of less than 0.1 is trivial; 0.1-0.3 small; 0.3-0.5 medium and over 0.5 large (Cohen, 1988).

Participants:

The research sample consisted of 134 students (mean age 17,4 years) of upper secondary education.

FINDINGS

The measured values of correlation coefficients ($r=0.455$) between the results of BCOT and ADT were significant at significance level of 0.001. In any case, the correlation coefficient unmistakably indicates moderate dependence between test results of BCOT and ADT. Since Bourdon test is standardized, verified and validated instrument to measure the level of vigilance and to test the ability of its distribution, this correlation makes the distribution of attention test an appropriate tool to measure the level of attention and the ability of its distribution among secondary school youth. Only moderate correlation with the results of BCOT is richly balanced simplicity and time undemanding ADT compared to Bourdon test.

CONCLUSIONS

Work has met its goal. Attention distribution test (ADT) is an appropriate tool to measure the level of attention among secondary school youth. Its results are statistically significantly correlated with the results of standardized Prague modification of Bourdon cross-out test (BCOT). In testing we also verified and that it is time-saving and does not burden pupils excessively.

It does not, of course, substitute the Bourdon's test. The later also monitors the attention with prolonged load, also distinguishes errors and performance. Moderately strong correlation between these two tests have confirmed that ADT really tests the distribution of attention, as the Bourdon's test does. For the final confirmation of this thesis further testing would be needed.

References

- Audley, R. J. (1988). *Basic psychological processes: Attention, memory, responsetime and their changes*. UCL. London.
- Cabanová, K. (2013) Attention capture preferences in teachers and pupils: differences and similarities. In: *Procedia - Social and behavioral sciences - Vol. 106 (2013), s. 519-522*
- Cabanová, K.. (2009). *Kompetencie učiteľov pri posudzovaní pozornosti žiakov*. Dizertačná práca, Pedagogická fakulta UK
- Crkoň, M. (2015). *Overenie testu distribúcie pozornosti u študentov vo vyššom sekundárnom vzdelávaní..* Diplomová práca UK PdF
- Đuričová, K. (1989). *Teória a psychodiagnostika pozornosti v školskom výkone*. Záverečná práca. Bratislava: VÚDPaP.
- Hamranová, A. (2003). Intervenčný program vo výchovno - vzdelávacom procese. In: *Slovenské školstvo v kontexte európskej integrácie. Zborník prednášok z medzinárodnej konferencie*. Nitra: UKF.
- Chalupa, B. (1981). *Kapitoly zo všeobecnej psychológie*. Pozornosť a jej úloha v psychickej regulácii činnosti. Bratislava: SPN.
- Lemešová, M. (2013). Sociálno-psychologický výcvik ako súčasť pregraduálnej prípravy učiteľov a učiteliek. In: *SapereAude: Pozitívni vzdelávaní a psychologie 3*. Hradec Králové: Magnanimitas.
- Plháková, A. (2004). *Učebnice obecné psychologie*. Academia. Praha
- Svoboda, M., Krejčířová, D, Vágnerová, M. (2009). *Psychodiagnostika dětí a dospívajících*. Portál. Praha
- Smetanová, D. (2012). Intímna komunikácia v žiackych kluboch. In: *Kultúra škôl a výchovných zariadení*. Bratislava: UK v Bratislave.
- Šramová, B.(2004). Cognitive training - Teacher's help. In: *Studia Psychologica*. Volume 46, Issue 3, pp. 203-210
- Šramová, B. (2013). Adolescent attitudes towards quality of life. In: *Psychology & Health*. - ISSN 0887-0446, Vol. 28, no. special issue 1, p. 315.

Metaphors Of Medical Students About Embryology Education

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ABSTRACT

Metaphor can be defined as characterization of a phenomenon in familiar terms. Metaphor researches were used in training studies especially. In our study we aim to get information about the embryology phenomenon of medical students, and to determine the influencing factors of this phenomenon with their reasons.

Our study was composed of participation of 100 students from Abant İzzet Baysal University Faculty of Medicine Class II grader in the 2014- 2015 academic year. The result of evaluating the questionnaires 100 (30 male, 70 female) students' metaphors were taken into account. The data were evaluated according to age, gender, the place where they stay during the educational life and the reason for selecting the faculty of medicine. In order to detect metaphors the forms were given to the students as "Embryology is similar/like, because" and requested to complete the sentence with the reasons. The number and percentage of produced metaphors were evaluated. The results of the questionnaire show that there are 75 metaphors used by the students and the metaphors are classified into 8 different categories after the evaluation. According to the findings of the study, the mostly produced metaphors were life, seed, miracle, etc. Consequently, metaphors can be used as a powerful research tool in the understanding and explanation of personal perceptions of embryology education among the students of medicine faculty. Therefore, metaphors help us to develop of educational methods and devices for embryology lessons.

Keywords: Metaphor, embryology, medicine students

INTRODUCTION

Metaphor, coming from Greek word "metaphora", composed of meta: among and pherin: carrying, means "carrying over" (Lakoff and Johnson, 2010). Metaphors are used to make more effective means and to express an opinion on another concept. Metaphor can be defined as a concept characterized by the familiar terms. Metaphors are not only figures of speech, but also create an essential mechanism of the mind that allows modelling and reification of prior experience. Metaphors can be used as powerful educative tools (Perry and Cooper, 2001; Zhao, Coombs, and Zhao, 2010). People with using metaphors, can embody a concept or event, and be able to express their thoughts and feelings more clearly (Aktekin, 2010). Using a metaphor helps people for what they actually tell (Glucksberg, 2003). There is a unity and internal consistency of metaphors to provide understanding the hidden opinions. Metaphors can be stimulative and evocative to reveal the relationships that may not be understand from the direct questions (Leavy McSorley and Bote, 2007). Metaphors can be seen as important elements of thinking and talking about complex phenomena. With using metaphors and visual images, educators will have a deeper mentality about their roles, responsibilities, nature of education and teacher-student relations. There are many useful metaphors. Looking upon the problems about education as a mother, father, gardener or a doctor, advices about how should a person progress. Metaphors help teachers which want to develop their teaching strategies (Çelikten, 2006). Metaphors are used in many areas of education. There are

various complex dimensions of the educational system. Metaphors in this system has an important place in the evaluation of these complex dimensions (Yılmaz, 2007). Metaphor studies mostly found in educational areas like teaching. However, there is a few research about the medical areas. And the concept of metaphor study of the embryology education could not be found in the literature. There are many arguments about the quality of medical education and educational methods all over the world (<http://tdkterim.gov.tr/>; Gluksberg 2003). In Mersin University, at Faculty of Medicine, at Department of Anatomy, Prof. Dr. Mustafa Aktekin have been used metaphor method (Çolak S, 2014; Kalyoncu, 2012; Gültekin, 2013). In basic medical education, embryology course has a very important place. The knowledge of human embryology is related with clinical medicine and necessary to medical students, gynecologists, pediatric surgeons and pediatricists. Therefore, students must be trained well in the subjects given in this course. The level of learning the knowledge of this course is very important for the further studies and courses of students. Based on these informations, the aim of this study is to determine the feelings and opinions of medical students about embryology course with using metaphor method.

THE STUDY

Our study is confirmed by second year of 100 Medicine Faculty students from Abant İzzet Baysal University in academic year of 2014-2015. The study is based on voluntary participation. The age of the participants was between

18 to 28 years old with the majority (n=83, or 83 percent) in the 19-21 age bracket. While evaluating the surveys, metaphors of 100 students (30 male, 70 female) were taken into account. There were considerably more female (n=70, or 70 percent) than male (n=3, or 30 percent) students among the participations. Data were evaluated according to the age, gender, the place where they stay during the educational life, the geographical region where he/she comes from and the reason why he/she prefer medicine faculty. To identify the metaphors we gave forms to the students as like “Embryology is similar/like to..... because,.....” and we asked to complete the sentences with their reasons. The number and the percentages of the metaphors were calculated. As a result of the survey, 75 metaphors were produced by the students and these metaphors were evaluated with their reasons and classified into 8 different categories (Aytekin, 2010). Some metaphors were categorized easily. The reasons of the metaphors were helpful for evaluation of hardly categorized metaphors. The categories we used were; dissipation-unknown, hopeless struggle, bitter and sweet, discovery-detection, lead-intelligence, scope out, distress and feeling of flying-unhealthy pleasure. The collected questionnaires formed data source of study. The number and the percentage of the categories were calculated and statistical analysis of data carried out using SPSS program.

FINDINGS

The evaluations of the categories were concretized by two people from different fields and the categories became definite. Metaphors were divided into 8 different categories and the number of the students are given in Table 1 with percentages and categories of metaphors. The majority of the metaphors gathered in the category of “Discovery-Detection” while the least metaphor gathered in the category of “Feeling of flying/Unhealthy pleasure”. The mostly produced items of “Discovery-Detection” metaphor were life, seed, miracle, etc.

The Metaphor Categories	Frequency (F)	Percentage (%)
Dissipation-Unknown	10	10%
Hopeless struggle	15	15%
Bitter and Sweet	12	12%
Discovery-Detection	28	28%
Lead-Intelligence	9	9%
Scope out	9	9%
Distress	11	11%
Feeling of flying-Unhealthy pleasure	6	6%

Table 1: Number and percentages of the metaphor categories about embryology education.

According to the results of the surveys’ evaluation, 71% of the students chose “with my own request” at first option about preferring medicine faculty and 20% of them chose “with my family request” at second while “because of my family living here/nearby” option became at last with 0%. Reasons of choosing the medicine faculty are given in Table-2.

Reasons about choosing the medical faculty	Frequency (F)	Percentage (%)
My family request	20	20%
My family living here/nearby	0	0%
My own request	71	71%
Job guarantee	9	9%

Table-2: Number and percentages of the reasons about choosing medical faculty by the students.

If we evaluated the metaphors according to the gender, 30% of the female students and 23,3% of the male students saw the embryology lesson as explore and contributing to reveal. The three categories where the answers of the male students were

Table-3: Distribution of number and percentages of the metaphor categories by gender

Methaphors		Gender		Total
		Male	Female	
Dissipation-Unknown	Count	2	8	10
	% within metaphors	20,0%	80,0%	100,0%
	% within gender	6,7%	11,4%	10,0%
	% of Total	2,0%	8,0%	10,0%
Hopeless struggle	Count	6	9	15
	% within metaphors	40,0%	60,0%	100,0%
	% within gender	20,0%	12,9%	15,0%
	% of Total	6,0%	9,0%	15,0%
Bitter and Sweet	Count	2	10	12
	% within metaphors	16,7%	83,3%	100,0%
	% within gender	6,7%	14,3%	12,0%
	% of Total	2,0%	10,0%	12,0%
Discovery-Detection	Count	7	21	28
	% within metaphors	25,0%	75,0%	100,0%
	% within gender	23,3%	30,0%	28,0%
	% of Total	7,0%	21,0%	28,0%
Lead-Intelligence	Count	2	7	9
	% within metaphors	22,2%	77,8%	100,0%
	% within gender	6,7%	10,0%	9,0%
	% of Total	2,0%	7,0%	9,0%
Scope out	Count	4	5	9
	% within metaphors	44,4%	55,6%	100,0%
	% within gender	13,3%	7,1%	9,0%
	% of Total	4,0%	5,0%	9,0%
Distress	Count	3	8	11
	% within metaphors	27,3%	72,7%	100,0%
	% within gender	10,0%	11,4%	11,0%
	% of Total	3,0%	8,0%	11,0%
Feeling of flying-Unhealthy pleasure	Count	4	2	6
	% within metaphors	66,7%	33,3%	100,0%
	% within gender	13,3%	2,9%	6,0%
	% of Total	4,0%	2,0%	6,0%
Total	Count	30	70	100
	% within metaphors	30,0%	70,0%	100,0%
	% within gender	100,0%	100,0%	100,0%
	% of Total	30,0%	70,0%	100,0%

observed to be less is “Dissipation-Unknown, Bitter and Sweet and Lead-Intelligence” categories with a percentage 6,7 % at the same time while the category where the answers of the female students were less is “Feeling of flying-Unhealthy pleasure” category with a percentage 2,9. The distribution of the metaphor categories by gender is shown in Table-3

CONCLUSIONS

The essence of the metaphors is using something to explain a phenomenon. Students can use their traits and forms of their phrases to evolve new understanding and concepts. Educators can use the metaphors needed to reflect ideas about their lessons (Boostrom, R.1998). Metaphor is not just a figure mentioned; it is also a figure of thought (Kramsch C. 2003). As one of the most important perception tool, investigating the metaphors is important because of uncover the underlying of beliefs and assumptions about students and education and the roles made by educators in the class (Ben-Peretz, M., Mendelson, N., Kron, F.W. 2003). When we examine the metaphor studies about education, in bachelor degrees most of the studies are seen in departments of science teacher, computer teacher and formation education. As it is mentioned, in this studies also showed that people express their subconscious emotions and any phenomenon which they can not say directly, with metaphors in significant.

The first aim of this study was to explore the dimensions of the students’ perceptions of embriology education. In our study we want metaphors about embriology lesson from medicine faculty students and they explain the embriology with life, seed and miracle. Embriology lesson requires visual, three dimentional thinking and because of its detail cause variety in metaphors. Therefore, we think that medicine faculty students should be informed more before they face with embriology lesson. Clinical practice should be brought to the laboratory course, embriology course should be repeated at the beginning of clinical training and students should be encouraged to participate in scientific laboratory studies. Also There is need to review the embriology course content. Knowledge production with conceptualization and expression skills of the students can be developed by providing them to produce metaphors (Aybek H, 2012). Making this type of researches repeatly in certain periods to medicine faculty students, and disseminating in all faculties at the country will be a directive for medical education. Using various of metaphors will be useful in medical education in next studies. Metaphor studies are important in order to contribute to attain the candidate of doctors. In conclusion, to teaching the concepts more concretely in embriology lesson, metaphors provide positive addition to remove the learn difficulties in medicine faculty students.

References

- Aktekin, M., Aktekin, NC. (2010). Anatomi öğrenmenin kaçınılmaz acısı. XIIIth National Congress of Anatomy with International participation, Kyrenia, Turkish Republic of Northern Cyprus, 28th October-1st November, 2
- Aybek H. Pamukkale üniversitesi tıp fakültesi dönem I, II ve III. sınıf öğrencilerinin Doktor kavramına ilişkin ileri sürdükleri metaforlar. Tıp Eğitimi Dergisi 2012;35/30–43.11
- Ben-Peretz, M., Mendelson, N., Kron, F.W. (2003). How teachers in different educational context view their roles. Teaching and Teacher education, volume 19, number 2, 277-290.
- Boostrom, R.(1998). Safe Spaces: Reflections on an educational matephor. Journal of curriculum studies, 30(4):397-408.
- Çolak S, Metaphoric Perceptions Of Physical Education And Sports Students To The Concept “Computers Education”. INTE 2014, International Conference On New Horizons In Education. Paris, France, 25-27, June, 2014.
- Glucksberg, S. The psycholiguistics of metafor. Trends in cognitive sciences .Vol.7. no.2 February 2003
- Gültekin M. İlgöretim Öğretmen Adaylarının Eğitim Programı Kavramına Yükledikleri Metaforlar. Eğitim ve Bilim Dergisi 2013: 38/126-141.6.
- <http://tdkterim.gov.tr/bts/>
- Kalyoncu R. Gorsel sanatlar öğretmenleri adaylarının “öğretmenlik” kavramına ilişkin metaforları. Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi 2012: 9/471-484.
- Kramsch C. 2003. Metaphor and the subjective construction of beliefs. In: Kalaja P and Barcelos AMF (eds.). Beliefs about SLA: New research approaches. Springer, pp.109-128.
- Yılmaz ,A.(2007).İlgöretim mufettislerinin mesleki görevlerini yerine getirme durumları ile tukenmişlik düzeyleri arasındaki ilişki. Yayınlanmış doktora tezi, Abant İzzet Baysal Üniversitesi,Sosyal Bilimler Enstitüsü.
- Zhao, H., Coombs, S., & Zhou, X. (2010). Developing professional knowledge about teachers through metaphor research: facilitating a process of change. Teacher Development, 14 (3), 381-395.

Methodological Note On Experiments In Economic Education

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ABSTRACT

Field experiments as opposed to the laboratory experiments take place in natural setting. As a result, generalization of results should be much easier depending on type of the field experiment. On the other hand, the cost of field experiment might be its low internal validity, where the control over variables might be weaker. This might lead to the presence of confounding variables, affecting consequently dependent variables. Recently, rising interest in economically educated public by many institutions has led many researchers to test possible effects of economic education on behaviour of individuals on real market. This paper will try to answer to what extent is the laboratory experiment adequate as a good instrument for testing effects of economic education on achievement of optimum outcomes in a comparison with field experiment. The paper concludes that both methods should be seen as complements.

Keywords: Field Experiment, Laboratory Experiment, Internal Validity, External Validity

JEL classification: B4, I20, Z00

INTRODUCTION

Experimental economics is relatively new discipline, which is more frequently used in order to address important economic phenomena like testing effects of economics education. Common consideration across social sciences is the extent to which results might be generalized to the field. This is also important issue for experimental research findings, with a common question whether behavior inside laboratory is a good approximation of the development in the real world. On the other hand, researchers have at their disposal field experiments as another form of experimental testing outside the laboratory. Methodological studies are typically less attentive to external validity issue, which is however especially challenge in case of experimental economics. This paper aims to tackle the most important methodological issues related to external validity and compares to what extent is the laboratory experimentation a good instrument for testing effects of economic education in a comparison with field experiment. The paper concludes that both instruments should be seen rather as complements.

Internal and External Validity Issues

Laboratory experiment allows to control environment, in which random allocation of subject sample to controlled or experimental group allows for a direct identification of examined phenomena, (Howitt & Cramer, 2008). Standardized experimental procedures thereby contribute to more reliable outcomes with a high internal validity. Additionally, the effect of confounding variables is significantly reduced. However, frequently mentioned critique is that an experiment does not reflect real world and therefore its utilization for economics is rather weak. Several experimental economists deal with external validity issue and argue that there is no need for experiments to be realistic as long as they try to test and compare theories, (Plott, 1982), or that the setting of realistic assumptions is reliant on the type of the experiment, whether theoretical experiment or test-bed experiment is the case, Schramm (2005). Additionally, Guala (2005) notes that laboratory simplification of reality may paradoxically cope with problems of scale, where some phenomena are too big or too small to be examined in their natural fields. Furthermore, also right amount of variation with one varying factor *ceteris paribus* is advantage of laboratory environment as opposed to natural environment, where we simply pretend that certain factors do not change. Additional argument is that laboratory experimentation, as a simplification of reality, is in line with economic modelling. Well known knowledge is that a replication of complexities of the real world is rather counterproductive and ability to examine given phenomena significantly declines, (Friedman, Sunder, 1994).

Field experiments represent alternative option to the laboratory experimentation. The so called natural field experiment, where subjects don't know that they are part of an experiment, represents the purest form for estimation of the treatment effect of interest. Thereby, Hawthorne's effect, (where subjects know that they are being observed by experimenter), might be significantly eliminated. Furthermore, natural setting of field experiment allows to weaken partially common criticism of low external validity present in laboratory experiment. Thereby, outcomes of field experiment are easier to generalize. On the other hand this may lead to presence of confounding variables, threatening thereby internal validity.

The next section will discuss to what extent is a generalization of an experimental knowledge desirable and how a clear delineation of functions of laboratory experiment may strengthen validity of experimental outcomes.

Delineation of External Validity

Definitions of external validity vary substantially and many experimental economists tend to focus on other methodological issues, typically downplaying relevance of external validity as suggested by Plott (1987, 1999) despite its significance. Generally, simple notion of external validity refers to the extent to which results might be generalized, but according to Lucas, (2003) following definition should briefly outline its substance:

“External validity refers to whether the results of a study can be legitimately generalized to some specified broader population”, (McTavish and Loether 2002, p.133)

“External validity concerns the extent to which causal inferences...can be generalized to other times, settings, or groups of people.” (Monette, Sullivan, and DeJong 2002, p.236)

The other possibility to clarify concept of external validity is to use a method of contrast with respect to internal validity. Internal validity (in line with tradition of deductive reasoning and modeling in economics) is the case when some particular cause effect relation, together with interaction of certain factors, has been properly secured by the experimenter. More technically, results of an experiment E are internally valid if the experimenter attributes the resulting effect Y to a set of factors X “and X is really a cause of Y in E. On the other hand, external validity is the case if X causes Y not only in E, but also in a set of other circumstances F, G, H...”, (Guala, 2005, p.142). This definition is however less demanding from the point of view of Levitt and List (2007a) and Kessler, Vesterlund, (2010). According to them, this definition only refers to the qualitative relationship between two variables, which holds only across similar environments. In contrast, quantitative concept of external validity requires that the relationship between two variables in one design should be applicable also in other comparable settings. Most experimental studies lack this higher standard feature, which should capture the world at large.

To sum it up, external validity in view of Campbell (1979) involves generalizing to (particular target persons, settings and times) and across (types of persons, settings and times).

If we are to evaluate adequacy of field experiment or laboratory experiment, it depends on whether internal or external validity is preferable. In this sense we slightly face trade-off of ability to generalize to wider population versus ability to establish relevant causal effect with isolation of confounding variables.

Parallelism and Generalization

Parallelism, as one of important precepts outlined by Smith (1982), is sufficient to transfer experimental outputs to the other environments: “Propositions about the behaviour of individuals and the performance of institutions that have been tested in the laboratory microeconomies apply also to non-laboratory economies where similar *ceteris paribus* conditions hold.”(Smith 1982, p.936).

What are then limits of this precept towards generalization of experimental knowledge into the field? Question arises to what extent the laboratory experiment should mirror real world versus theoretical model. On the one hand, too much complexity of a field built into the laboratory experiment may threaten to distinguish causes and effects. On the other hand, too much adherence towards assumptions of a formal model may be met with the problem of artificiality. Consequent loss of connection with real world development is inevitable as emphasized by radical localism, (Guala 2002). Notwithstanding, we may question adequacy of radical localism, whose view is that experimental outcomes are not applicable outside the walls of the laboratory. As Lucas (2003) notes, it is impossible to measure objectively many concepts in the social science and empirical investigation is conducted in concrete settings defined by a time and place (Cohen 1980), while the aim of the experiment is to produce general knowledge. As a result, it is impossible to produce general knowledge in the absence of theory. In other words, highly realistic experimental design may increase informational value of output, but it is impossible to generalize knowledge to new settings without theory. Additionally, without proper theoretical framework, internal validity of experiment might be weaker and therefore causality under the test non-existent.

One of the solutions how to increase external validity of experimental results might be to turn to field experiments in which external validity is secured more due to the connection with real world. Its undisputable advantage might be summarized accurately by the following statement:

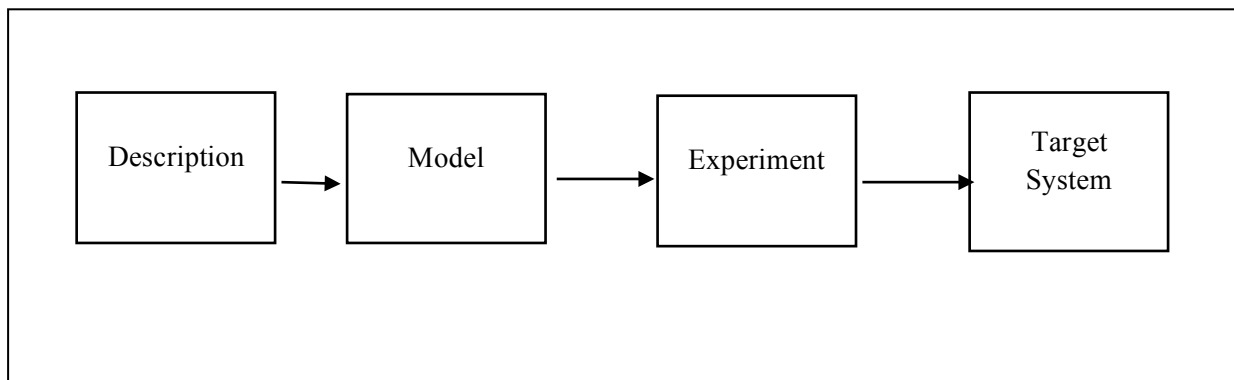
„Relative to traditional empirical economics, field experiments provide an advantage by creating exogenous variation in the variables of interest, allowing us to establish causality rather than mere correlation. Relative to a laboratory experiment, a field experiment gives up some of the control that a laboratory experimenter may have over her environment in exchange for increased realism.“ (List, Reiley, 2008, p.1). On the other hand field experiments may contain too many confounding factors, which is impossible to eliminate in the real world, threatening thereby internal validity.

Experiments and mediators

Firstly, experiments are understood as mediators towards long path leading from the formulation of hypotheses about the world towards their final application. If the role of experiments with respect to mediators will be closely clarified, it will enable to understand its relationship with respect to external validity and identify potential weaknesses.

The following Figure defines more closely the role of experiments in scientific research. The target system in economics is typically real world entity, difficult to control fully by economists. The closer examination of a target might be however done via experiment. Firstly, model is used to deliver a theoretical idea about the economy. Consequently, a concrete hypothesis is formulated based on the model, with possible considerations what would happen if some changes were made to a key variable. However, the hypothesis is not tested in direct relation to a target, but experiment serves as a method for verification of a given phenomenon. The role of experiments is two-folded. Firstly, they may replace models altogether or they may complement them if they seem too abstract or incomplete. It is important to note that experiments are only mediators and are not targets themselves. They are just a mid-step, which is supposed to help bridge the gap between ideas and domain of application. Since experiments are considered as a substitute or complement to models we may preconceive that they work in many ways like models. This is also emphasized by Guala (2005) who states that changing initial assumptions of model with consequent observation what will follow from these changes is the same, regardless of whether it is done by theorists or experimenters in the lab. The crucial difference between model and simulation of experiments lies in its relationship to target. If we consider the relation experiment versus target system, it is based on deep and material level, whereas the relationship between simulation and target system is based on formality and abstraction. This suggests that experiment should possess more of external validity than model, however not too much in order to substitute for target system and not too much to lose all theoretical background, which is important for application of acquired general knowledge in different settings.

Fig. 1 – The route from theoretical hypothesis to the real world



Source: Guala, (2005).

So far the discussion above outlined an experiment as a mediator. The role of mediator within the experiment was not specified so far. Mediator basically represents the way through which the experimental treatment affects the outcome, (Salganik, 2013). For instance, according to Gerber and Green (2012), vitamin C represents the mediator in the relationship between limes and scurvy, however it took long time to researchers to discover the responsible mediator which actually prevents scurvy, (Carpenter, 1986). Basically it provides us with information why the observed effect happened. However, it is difficult sometimes to isolate given mediator and thereby identify “why”. As a result, the explanatory power of experiment might be limited in terms of validity. When experimenters establish causal chain with respect to mediator, they have to cope with its measurability and manipulation, (Spencer, 2005). In most experiments it is hard to experimentally manipulate the mediator. As a result experimenters mostly apply “measurement-of-mediation” design. In this case experimenters the mediator is simply measured by conducting survey questionnaires.

On the other hand, if we are talking about natural field experiments, setting up experimental design with isolation of confounding variables is out of question. So we may ask what distinguishes field experiments as mediators from laboratory experiments. Crucial difference with respect to laboratory experiments lies according to Salganik (2014) in the possibility to affect the mediator inside the field experiment. Apparently, both manipulation and measurement of the mediator is difficult in the field. Measurement of the mediator is not doable due to impossibility to conduct survey with participants. Also manipulation of the mediator is impossible out of the laboratory. As an example might serve experiment of Word et al (1974), where a placebo pill with

different labels was used to manipulate tension among participants, which would be too difficult to apply in a field with so many participants.

Aforementioned discussion suggests that both field experiment and laboratory experiment have its drawbacks. The former with respect to internal validity since it is impossible to measure and manipulate the mediator, and the latter with respect to external validity due to its artificial lab nature. As a result, it is advisable to see both methods as complementary.

Type of an Experiment

Many methodological studies suggest that the level of external validity present in an experimental design depends on the type of experiment. For instance, Kessler, Vesterlund (2010) highlight that external validity is more important for experiments aimed to search for empirical regularities compared to a theory testing experiments. Similarly, Smith (1982) indirectly states that more attention regarding parallelism should be paid to experiments that do not aim at testing theories. This view is also supported by Schramm (2005), where the external validity required depends on the goal of the experiment. Compared to the previous studies he provides thorough analysis of experiments, according to the intensity of external validity needed. Theory testing experiments, in which category most of the experiments fall according to him (after rough categorization of 69 papers, where 33 papers fall in category testing theories), do not require external validity at such level, like other types of experiments. In this case internal validity is preferable to external, mainly because of ambitions not going beyond the walls of laboratory in terms of generalization. Fehr and Falk (2003) also argue that for the sort of experiments, which aim to test a theory or find a failure, evidence is important exactly for theoretical framework, but not for a closer understanding of the real world. Theory stress tests and experiments searching for empirical regularities are more important in terms of external validity. Finally, category of experiments aimed to advise policy makers is highly demanding in terms of external validity. This suggests that validity of laboratory outputs is matter of separate evaluation of each experiment supporting thereby Smith's view, (Smith 1985) that external validity issue is rather empirical thing and it is up to the critics to falsify parallelism of any specific experimental output.

Also in case of field experiment the type of experiment denotes its closeness to more realistic assumptions. According to Harrison and List (2004, p.5) there are six factors, which determine the field context: the nature of the subject pool, the nature of the information individual bring to task, the nature of commodity, the nature of the task or trading rules applied, the nature of the stakes and the environment in which the subjects operate.” Artefactual experiment represents sort of laboratory experiment, which uses non-standard subject pool, particularly subjects from the market of interest. According to Levitt and List (2007b) this could reduce bias, which may arise in the lab due to the sample, which differs in systematic ways from the field. As a result, outcomes might be more generalizable. Furthermore, depending on experimental design, one can obtain divergent experimental outcomes. Example might be an experiment, which requires more abstract and cognitively challenging task, incompatible with market experience of professionals. Naturally, students outperform professionals in this case, which was proved by studies like Burns (1985) or Carpenter and Seki (2005). This confirms that external validity required is derived from type of experiment, (whether theoretical or more practical).

On the other hand, market experience matters in some sort of experiments and non-standard sample is highly desirable in this case. As an example might serve laboratory experiment of Palacios-Huerta and Volij (2006), where male professional soccer players are in line with minmax model, whereas results of students are much further from the theory.

Secondly, framed field experiment contains realistic component of the commodity, task, stakes or information drawn from the real market of interest. As Levitt and List (2007b) point out typically the stakes in the laboratory experiment are much lower than in the real word environment. As a result, incentives of subjects and their consequent strategy might be affected. On the other hand, cognitive costs in the laboratory might be higher or lower than in the real world. For instance if we consider students, who are supposed to solve highly abstract task in the laboratory, cognitive costs for solving such a task might be much higher than is actually worth it as opposed to the field. Furthermore, if we compare it with players in the field, those have more at stake, more resources at their disposal and are not restricted by short time interval like in an experiment. Moreover, they can discuss possible strategies.

Lastly, natural field of experiment occurs in natural environment, where subjects do not know that they are under scrutiny. This sort of experiment is combination of experimental method with real data. One interesting feature of natural field experiment is longer time horizon. Laboratory experiments are usually designed for short time

period in hours as opposed to field. There might be significant differences in outcomes depending on length of time horizon. Lewitt and List (2007b) mention as an example study of Gneezy and List (2006), where hot decision making, typical for short run period, might significantly deviate from long run cold decision making. This is demonstrated on gift exchange experiment, in which workers effort in the first hours of job in gift treatment is substantially higher than in the non-gift treatment, however difference ceases out after few hours.

Even if we are talking about the field experiment, the same conditions hold as in case of laboratory experiment about proportion of required external and internal validity. Although basically requirements are posed on higher external validity in case of laboratory experiment and higher internal validity in case of field experiment, the final proportion is primarily dependent on type of experiment.

Experiments and its generalization “to” and “across”

As already noted above, external validity differs with respect to generalization “to” and “across” population, settings and times. It is crucial to distinguish between these two aspects, since it puts different requirements on the nature of external validity.

“Generalizing to” a larger population is consistent with a view of qualitative characteristic of external validity, where generalization is expected to be applied. When “generalizing to” a larger population, it is believed by opponents that experiments using samples of undergraduate students (so-called non-probability sample) suffer from low external validity, because it is impossible to apply findings to a larger population, (so called probability sample), (Kessler, Versterlund, 2010). Few arguments speak against this statement. Coming back to discussion related to “type of the experiment”, mostly experiments tend to test theoretical relationships. If the purpose is to test theoretical principle, it should apply not only to non-probability, but also to probability sample. Moreover, probability population exhibits characteristics of more homogenous population as noted by Lucas (2003), thereby reducing variance in experimental measures and probability of false results. In this case low external validity is out of the consideration. Secondly, some theories don’t dispose a larger population, to which experimenters are supposed to generalize, since it makes proposition unbounded by the specifics of population parameters. Lastly, the most important argument mentioned in the beginning is about impossibility to generalize knowledge to other setting without proper theoretical backgrounds.

If on the other hand generalization is made across the population, different requirements about external validity hold. Generalizing across population is consistent with more demanding view of quantitative characteristic of external validity. Neither the choice of probability population nor the choice of non-probability population might help to generalize across populations, since finding from a sample itself have no informational value regarding other populations. As Lucas (2003) points out there is no reason to believe that survey with a sample of adult Americans could generalize across population better than experiment comprised of female freshman when examining whether a higher status is related to higher self-efficacy. No methodological procedures allow for generalization across population.

The only solution is to generalize via theory. If we consider generalization across the settings at first sight it may seem that the test in more natural environment is more generalizable than a test in more artificial environment. If we consider example of field experiment aimed to study interaction in class of high-school students, it might be generalizable to other sort liberal arts high school students, which is however of no significance. On the other hand, there is no reason to believe that these results from field might be generalized to a group of friends or family, (Lucas 2003). This suggests that it is not possible to generalize beyond the particular populations not depending on whether the laboratory experiment or field experiment is the case. As a result, the level of external validity is comparable. The only option to generalize across settings is to find connection via theoretical backgrounds again.

Paradoxically, in case of generalization to and across, the artificiality is helpful tool which may strengthen not only causation of examined phenomena in terms of internal validity, but also contributes to more probable generalization trough eliminating irrelevant variables, as noted by Greenwood, (1982).

Economic Education Experiments

Several field experiment studies tried to verify the impact of economic education on individual behavior, among them Bernheim and Kotlikoff (2001), Carpena et al. (2011), mostly leading to the conclusion that the provision of economic education improves the basic decision-making of consumers. A few studies were conducted with respect to the effect of economic education on a firm’s decision-making and outcomes like Karlan and Valdivia (2010), Bruhn and Zia (2011) or Drexler, Fischer, Schoar (2011), generally concluding that the economic training on firm-level contributes to significant improvement in consequent economic outcomes of entrepreneurs. However, there are also field experiments which do not confirm significant effect of educatory

programs on economic literacy of high school student sample like Becchetti et al (2013). On the other hand, Luhrmann (2012) finds positive effect of training programs on financial attitudes of students such as saving propensity, etc.

Also laboratory experiments are used to identify possible effects of economic education. For instance, Bakshi (2009) evaluates the performance of economically educated subjects with respect to their coordination in the economy with multiple Pareto-ranked equilibria. However, the evidence is not strong enough that individuals with economic training have better foresight. A more frequent convergence of subjects towards inefficient equilibrium over time is observed. Burke, Manz (2011), find through laboratory experiment that people endowed with higher levels of economic education are able to formulate inflation expectations based on better set of chosen information. Meta-analysis of Fernandes et al (2014) covering 168 papers, examines potential effect of economic education on achievement of optimum outcomes with conclusion that its role is rather narrowed, which holds even for lab-experimental studies.

This suggests that the effect of economic education is not straightforward and validity of experimental outcomes is exposed to several factors.

In line with previous discussion, it appears that manipulation and measurement of mediator in case of the laboratory experiment is possible. Let's suppose we want to measure the effect of introduced educatory program on achievement of optimum outcomes by individuals. The mediator in between these two variables is acquired economic literacy. The laboratory provides unique opportunity how to measure or manipulate this mediator. The first possibility is to let the mediator be fixed and just employ different samples, either students or professionals and observe potential effects of economic education on optimum outcomes through this mediator, accompanied by conducted question survey. The second possibility is to affect mediator through some educational procedure, which ensures that subjects are endowed by appropriate economic knowledge. As a result, we can observe behaviour of subjects in *ex ante* experiment, in which they are not endowed by economic knowledge and in *ex post* experiment, in which they are endowed by economic knowledge. As noted already above, there is rather limited possibility to measure and manipulate mediator in case of field experiment. In this sense, the lab offers unique opportunity and consequent comparison with field experiment in real world environment. On the other hand, experimental strategy in the laboratory is solely in hands of experimenter, who exogenously induces the roles as List (2011) claims. If applied on economic education, some individuals in the laboratory experiment are given economic knowledge through educational procedure, others not. In contrast, subjects in the field are endogenously selected by the market. For instance in List (2011), dealers in the sport cards show field experiment are endowed with intense trading experience. Their ability to think in economic terms is naturally acquired by experience on the market. This ensures realistic setting of experiment, which compensates for possible drawback in the laboratory.

Secondly, if we are to talk about the type of experiment, it seems that students sample is not always appropriate for testing effects of economic education. As a supporting argument might serve meta-analysis of Freccchete (2011), which claims that students mostly exhibit better performance with respect to highly abstract tasks. On the other hand, they are lagging behind in experiments, which require advanced market experience. In our case it implies, that student sample is mostly adequate in cases of highly theoretical laboratory experiments, whereas it loses in field experiments which require some advanced knowledge. In this case students' skills in the field market converge to skills of the least experienced subjects as claimed by Lewitt and List (2007b). Still it is worth to say that it might be difficult to examine some highly theoretical phenomena in the field due to inability to get the data. Thus, laboratory offers unique opportunity how to test some highly abstract economic education models, (for instance testing effects of economic education on subjects who suffer from money illusion and their ability to see through the veil of nominal values, like in case of experiment of Bakshi (2009)).

Thirdly, if we talk about ability to generalize and apply Lewitt and List (2007b) study on our case with economic education, we may claim that the laboratory environment enables us to identify what variables may potentially influence the level of economic literacy. On the other hand, it is impossible to identify how the level of economic literacy might affect outcomes on particular market. As a result, the main value added of laboratory experiments could be seen in their ability to artificially identify factors affecting the level of economic literacy and in simulation of hypothetical cases, which may possibly happen.

Both field experiments and laboratory experiments have its advantages and drawbacks as we can see from previous discussion. This suggests rather complementary role of field and laboratory experiment.

Thereby we may observe recently growth of studies, which try to combine both approaches (field and laboratory experiments), strengthening thereby validity of experimental outcomes.

For instance, Jakiela et al (2010) combine data from laboratory and field experiment to examine the causal impact of greater human capital in terms of education on respect for acquired property rights. Direct impact of

educatory programs on individual outcomes is proved by both methods. This suggests that combined approach of lab and field is highly promisable and both methods should be rather seen as complements in research. Brugiavini et al (2014) study the effect of acquired economic education on financial literacy and consequent investment attitudes. The study applies also combination of laboratory and field experimental approach, which confirms examined effect.

As a result it seems that recent development goes in a direction, where the role of field and laboratory experiment is considered as complementary in line with Lewitt and List (2009).

CONCLUSION

The aim of this paper was to evaluate to what extent is the laboratory experiment adequate as a good instrument for testing effects of economic education on achievement of optimum outcomes in a comparison with field experiment.

Firstly, various definitions of external validity were outlined. We argue that the level of external validity primarily depends on the way of delineation of the laboratory experiment and field experiment and has to be considered also with respect to internal validity. Consequently, explanatory power of field and laboratory experiment was discussed in terms of generalization, generalization “to” and “across” and its role with respect to mediator. Additionally, type of experiment was mentioned as the crucial factor, which decides about the size of sufficient external validity.

Lastly, discussed problematic was applied on experiments, which examine potential effects of economic education. Feasibility of field and laboratory experiments was compared with respect to its ability to measure or manipulate the mediator, with respect to type of an experiment and exogenous or endogenous selection of the sample.

It appears that the laboratory provides unique opportunity how to measure or manipulate the mediator, in our case the level of economic education. In contrast this is almost impossible in the field. Also, it shows up that its artificiality might be helpful in order to identify factors affecting the level of economic literacy and simulate hypothetical phenomena. On the other hand, field experiments offer helpful hand in generalization of knowledge acquired in the laboratory.

To conclude, afore-mentioned discussion suggests that neither field, nor laboratory experiment is superior to the other and they should rather be seen as complements.

References

- Bakshi, R., K., (2009). „Rational Agents and Economic Training“, The Case of Money Illusion in Experimental Study, *Journal of Economic Theory*, pp. 27-32.
- Becchetti, L., Caiazza, S., and Coviello, D. (2013). „Financial Education and Investment Attitudes in High Schools: Evidence from a Randomized Experiment.“ *Applied Financial Economics*, 23(10):817-836.
- Bernheim B.D. and Kotlikoff L., (2001). Household Financial Planning and Financial Literacy. In: Kotlikoff L. (ed.) *Essays on Saving, Bequests, Altruism and Life-Cycle Planning*. Cambridge, MA: MIT Press.
- Brugiavini, A., Cavapozzi, D., Padula, M., Pettinicchi, Y., (2014), “The Effect of Financial Education on Literacy and Behavior, Evidence from the Field (and from the Lab)”, available at: www.economia.unipd.it/sites/decon.unipd.it/files/FIRB_1%20The%20Effect%20of%20Financial%20Education%20on%20Literacy%20and%20Behaviour%20evidence%20from%20the%20Field%20and%20from%20the%20Lab_Brugiavin%20Cavapozzi%20Padula%20Pettinicchi_0.pdf
- Bruhn M. and Zia B. , (2011). „Stimulating Managerial Capital in Emerging Markets: the Impact of Business and Financial Literacy for Young Entrepreneurs“, *Policy Research Working Paper Series 5642*, The World Bank.
- Burke, M.A., Manz, M., (2011), “Economic Literacy and Inflation Expectations: Evidence from a Laboratory Experiment”, Research Center for Behavioral Economics, Federal Reserve Bank of Boston, Public Policy Discussion Papers, No 11-8, available at: www.bostonfed.org/economic/ppdp/2011/ppdp1108.pdf
- Burns, P.: (1985), *Research in Experimental Economics*, Vol. 3, JAI Press, Greenwich, CT, chapter “Experience and Decision Making: A Comparison of Students and Businessmen in a Simulated Progressive Auction,” pp. 139—153.
- Campbell, D.T., Cook, T.D., (1979). “Quasi-experimentation: Design and Analysis Issues for Field Settings.” Boston, Houghton Mifflin Co.
- Carpene F., Cole S., Shapiro, J. and Zia B., 2011, Unpacking the Causal Chain of Financial Literacy, *World Bank Policy Research Working Paper No. 5798*.

- Carpenter K.J. (1986) *The History of Scurvy and Vitamin C*. Cambridge, UK: Cambridge University Press, ISBN-13: 978-0521347730
- Carpenter, J. and Seki, E. (2005), "Do Social Preferences Increase Productivity? Field Experimental Evidence from Fishermen in Toyoma Bay." IZA DP No. 1697.
- Cohen, B.R., (1980). "The Conditional Nature of Scientific Knowledge." 71-110 in *Theoretical Methods in Sociology: Seven Essays*, ed. L. Freese. Pittsburgh, PA: University of Pittsburgh Press.
- Drexler A., Fischer G. and Schoar A., (2011). *Keeping it Simple: Financial Literacy and Rules of Thumb*. CEPR *Development Economics Workshop*, Barcelona, 8-9 October.
- Fehr and Falk (2003). "Why Labour Market Experiments?" *Labour Economics*, 10, pp. 399-406.
- Fernandes, D., Lynch, J.G., Netemeyer, R.G., (2014). "Financial Literacy, Financial Education and Downstream Financial Behaviors", forthcoming in *Management Science*, available at: papers.ssrn.com/sol3/papers.cfm?abstract_id=2333898
- Frechette, G., (2011). *Laboratory Experiments: Professionals versus Students*." SSRN papers, available at: papers.ssrn.com/sol3/papers.cfm?abstract_id=1939219
- Friedman, D. Sunder, S. (1994). *Experimental Methods. A Primer for Economists*, Cambridge University Press, ISBN 0-521-45068-3.
- Gerber, A.S. and Green, D. P., (2012) *Field Experiments: Design, Analysis, and Interpretation*, W.W. Norton, New York, London, ISBN-13: 978-0393979954.
- Gneezy, U., List, J.A., "Putting Behavioral Economics to Work: Field Evidence of Gift Exchange.", *Econometrica* 74, 1365-84.
- Greenwood, J.D., (1982), "The relation between Laboratory Experiments and Social Behaviour: Causal Explanation and Generalization." *Journal for the Theory of Social Behaviour*, 12, 225-50.
- Guala, F. (2002), "On the Scope of Experiments in Economics: Comments on Siakantaris." *Cambridge Journal of Economics* 26 (2), 261–267.
- Guala, F. (2005). *"The Methodology of Experimental Economics"*. Cambridge University Press, ISBN 978-0-521-85340-8.
- Harrison, G.W., List, J.A., (2004), "Field Experiments", *Journal of Economic Literature*, 42 (4), 1009-1055.
- Howitt, D., & Cramer, D. (2008). *Introduction to Research Methods in Psychology*, Pearson Education Limited, ISBN 978-0-13-205163-7.
- Jakiela, P., Miguel, E., te Velde, V.L., (2010), "You've Earned It: Combining Field and Lab Experiments to Estimate the Impact of Human Capital on Social Preferences", *NBER Working Paper* No. 16449, available at: www.nber.org/papers/w16449
- Karlan D. and Valvidia M., (2010). „Teaching Entrepreneurship: Impact of Business Training on Microfinance Clients and Institutions.“ *Review of Economics and Statistics*, MIT Press, vol. 93(2), pages 510-527, 01.
- Kessler, J., Vesterlund, L. (2010), "External Validity of Laboratory Experiments. In preparation for *The Methods of Modern Experimental Economics*, editors Guillaume Frechette and Andrew Schotter, Oxford University Press.
- Levitt, S.D., List, J.A., (2007a). "What Do Laboratory Experiments tell us about the Real World?" *The Journal of Economic Perspectives* 21, 153-174.
- Lewitt, S.D., List, J.A., (2007b). "Viewpoint: On the Generalizability of Lab Behaviour to the Field." *Canadian Journal of Economics*, Vol. 40, No. 2, pp. 347-370.
- Lewitt, S.D., List, J.A., (2009). *Field Experiments in Economics: The Past, the Present and the Future*. *European Economic Review* 53,1–18.
- List, J. A. (2011). "Does Market Experience Eliminate Market Anomalies? The Case of Exogenous Market Experience." *American Economic Review*, 101(3): 313-17.
- List, J. A. and Reiley, D., (2008), "Field Experiments in Economics," Palgrave Entry, Discussion Paper No.3273
- Lucas, J.W., (2003). "Theory-Testing. Generalization, and the Problem of External Validity, *Sociological Theory*, Vol.21, 3, 236-253.
- Luhrmann, M., Serra-Garcia, M., and Winter, J. (2012). *Teaching teenagers in finance: does it work?* *Discussion Papers in Economics* 14101, University of Munich, Department of Economics.
- McTavish, D.G. and Loether, H.J., (2002). *Social Research: An Evolving Process*. 2nd ed. Boston, MA: Allyn and Bacon.
- Monette, D.R., Sullivan, T.J. and DeJong, C.R. (2002). *Applied Social Research: Tool for the Human Services*. 5th ed. Fort Worth, TX: Harcourt College Publishers.
- Palacios-Huerta, I. and Volij, O.: 2006, *Experientia Docet: Professionals Play Minimax in Laboratory Experiments*. Working Paper. Available at: www.najecon.org/naj/cache/122247000000001050.pdf
- Plott, Ch. (1982). "Industrial Organization Theory and Experimental Economics", *Journal of Economic Literature*, 20: 1485-1527.

- Plott, Ch. (1987). "Dimensions of Parallelism: Some Policy Applications of Experimental Methods." In A.E. Roth (ed.) *Laboratory Experimentation in Economics: Six points of View*. Cambridge: Cambridge University Press, pp. 193-219.
- Plott, Ch. (1999). "Policy and the Use of Laboratory Experimental Methodology in Economics." In L. Luini (ed.) *Uncertain Decisions: Bridging Theory and Experiments*. Boston: Kluwer, pp. 293-315.
- Schramm, A. (2005). "Artificiality: The Tension between Internal and External Validity in Economic Experiments." *Journal of Economic Methodology* 12 (2), 225-237.
- Smith, V. (1982), "Microeconomic Systems as an Experimental Science"; *American Economic Review* 72: 923-955.
- Salganik, M. (2014), "Causal Chains and Mediation", blog of Princeton University Professor of Sociology, <https://msalganik.wordpress.com>,
- Salganik, M. (2013), "Mediators and Moderators: Making Experiments Interesting", blog of Princeton University Professor of Sociology, <https://msalganik.wordpress.com>.
- Smith, V. (1985), "Experimental Economics: Reply"; *American Economic Review*, 75: 265-272.
- Spencer, S.J., (2005), Establishing a Causal Chain: Why Experiments are often more Effective than Mediation Analyses in Examining Psychological Processes. *J Pers Soc Psychol.* 2005 Dec;89(6):845-51, www.ncbi.nlm.nih.gov/pubmed/16393019
- Word, C. O., Zanna, M. P., Cooper, J. (1974). "The Nonverbal Mediation of Self-fulfilling Prophecies in Interracial interaction." *Journal of Experimental Social Psychology*, 10, 109-120.

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Middle School Students' Perceptions About Concepts Of "Sports" And "Mathematics": Relationship Of Sports And Mathematics

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ABSTRACT

The purpose of this study is to analyze the perceptions of middle school students about “sports” and “mathematics” concepts and to show how the possible correlation between mathematics and sports is perceived by the students. For this purpose, the researchers developed a data collection tool entitled as “Sports and Mathematics (S&M)”. This data collection tool consists of one yes-no question and 4 open-ended questions. Then, this developed data collection tool was applied to students who are studying at a public middle school in Kandıra, city of Kocaeli. In this sense, the study was carried out with 117 middle school students. While the data obtained from open-ended questions were analyzed with content analysis. In conclusion, it was appeared that middle school students define sport as health and entertainment and mathematics as intelligence and universality. In addition to this, it was determined that students think that there is a correlation between sports and mathematics. It was ascertained that the students defined this correlation as making calculations, geometry and numerical expressions.

Keywords: Sports, mathematics, perceptions of middle school students

INTRODUCTION

Human beings are moving creatures and they have to move. Thanks to sports, people who live in this necessity from the time of their existence perform the superior examples of their moving abilities and their movements. In this sense, the definition of sports from a historical perspective is as in the following; it is a disciplined and cooperative game style which raises the fighters and based on competition and racing (Erkal, 1978). Turkish Language Association defines sport as (TDK, 2015); all the actions performed individually or in groups according to certain rules for improving body and mind. In another definition, sport is defined as a physical activity based on competition which is performed in a limited time and space with special equipments for having a record (Ertan, 2012). In addition to this, sport is seen as the training instrument of body, soul and mind (Yazıcı, 2014).

It is known that sport directly effects the development of human body and brings some features together with it such as love, friendship, tolerance, peace, sincerity and perseverance. While sport supports the ensuring of peace and the development of international relationships, it also contributes to the protection of public health (Sunay, 1998). Besides, it can be said that it directly or indirectly contributes for the purpose of improving self-confidence, taking responsibilities, being creative, performance, health and social features (Grössing, 1991). Sport, as it fulfills the “movement” needs of individuals, can be preferred for reasons like playing games, having fun, socializing and gaining a statue (Ertan, 2012). Under the light of all these stated benefits, together with the New Age, sport entered schools first in Italy and later in French, Spain and Germany. It was particularly thought as one of the ways of raising more successful individuals with national conscious at schools. For this reason, it was highly supported (Erdemli, 1990; Fişek, 1983). At this point, sport was started to be expressed as Physical education at schools. The Law about implementing Physical Education lessons at schools legislated in the Boston state of United States of America in 1853. The law forced all children at primary schools to participate in a certain physical education process every day (Heper, 2012).

When it is considered in this sense, the priority of the sports performed both in and out of schools can be sometimes games, sometimes performance, sometimes health and sometimes the other purposes (Demirhan, 2003). Among the other purposes, it can be thought that sport may positively affect the perceptions of students towards other lessons. Besides, it is stated that establishing a connection between the benefits of physical education and the basic learning fields of the 21st century such as critical thinking, problem solving, information analysis skills, is an essential necessity (Bailey, 2006). In addition to this, mathematics as another lesson which

includes these basic learning fields is attracting attention. In this sense, sport, mathematics and analyzing the correlation between these two concepts are seen as important. Within the framework of this importance, when weekly timetable of primary schools (elementary and middle) in our country was analyzed, it was seen that there are Physical Education and Sport lesson for two hours per week for all the grades in middle schools (5th, 6th, 7th and 8th grades) and also Mathematics lesson for 5 hours per week (MEB, 2015). At this point, it was thought to analyze the perceptions of middle school students towards sports, mathematics and the correlation between these two concepts.

Within the scope of this perspective, when literature on this topic was analyzed, it was seen that there are studies about locomotors skills of pre-school children, body image perception and body satisfaction (Kerkez, 2004; Kerkez, Tural & Akçınar, 2013), the body lives of students in the environments of physical education lessons (Koca, Güven, Bulgu & Demirhan, 2003), the factors affecting the achievement in physical education lessons (Yoncalık, 2009), the analysis of bodily/kinesthetic intelligences according to their cases of doing sports and by gender (Erturan & Göde, 2008), attitudes towards physical education and sport lesson (Erhan & Tamer, 2009; Hünük & Demirhan, 2003; Kangalgil, Hünük & Demirhan, 2006; Özer & Aktop, 2003; Şişko & Demirhan, 2002), the academic achievement and personal features of students who do sports regularly and who do not (Saygılı, Atay, Eraslan & Hekim, 2015). In their studies, Tarakçı and Kaplan (2006) analyzed the effect of social activities on the mathematics achievement in students with hearing impairments. Akyüz (2013) analyzed the correlation between mathematics achievement and the time allocated by students to extra-curricular activities. However, it was noticed that the meaning of sport from the eyes of middle school students was not analyzed. In addition to this, any study about the perceptions of middle school students about the correlation between mathematics and sport was not recognized. For this reason, it was decided to focus on this point. So, it is thought that a gap in literature about this topic will be resolved. In this regard, the purpose of this study is to analyze the perceptions of middle school students about the concepts of “sport” and “mathematics” and to show the possible correlation between mathematics and sports is perceived by students. Within the scope of this objective, the answers of the following questions were searched.

1. Do middle school students do sports in their free times?
2. What is “sports” according to middle school students?
3. What is “mathematics” according to middle school students?
4. Is there a correlation between “sport” and “mathematics” according to middle school students?
5. How do middle school students perceive the possible correlation between mathematics and sport?

METHOD

Research Design

In this study, qualitative research design was employed. Qualitative studies are the researches in which perceptions and events are displayed in a realistic and holistic way in their natural environments and it involves the analysis of the worksheets collected in this study. The analysis of the written material about the phenomenon or phenomena in question is stated as document analysis (Yıldırım & Şimşek, 2008). In this regard, in this study the data collection documents of middle school students were used as documents and they were qualitatively analyzed.

Study Group

The study was carried out with 117 students who are studying in a public middle school in Kandıra county of Kocaeli city. It was determined that 58,12% of the study group is female (n=68) and 41,88% is male students (n=49). 14,53% of the students are 5th graders (n=17), 24,79% of them are 6th graders (n=29), 29,06% (n=34) are 7th graders and 31,62% of them are 8th graders (n=37).

Data Collection Tools and Collecting Data

The data was collected by using the data collection form entitled as “Sport and Mathematics (S&M)”. This data collection form is composed of one yes-no question and 4 open ended-questions. Also in the form, the questions for learning the demographic features (gender, grade levels, etc.) of students were used. The purpose preparing open-ended questions was to identify the perceptions of students about sport, mathematics and sport+mathematics phenomena.

S&M was carried out with students who are studying in public school in Kandıra county of Kocaeli city between 08.12.2014 and 12.12.2014. As a result of this, 121 S&M were filled. 40 minutes were given students to fill in this form.

Data Analysis

First of all, all the collected data was analyzed one by one by the researcher. As a result of the analyses, it was decided not to evaluate 4 of the 121 S&M. After this decision, the data regarding the open-ended questions were evaluated by using content analysis. The purpose of the content analysis is to gather similar data around specific themes and to organize and interpret them in a way that readers can understand. In this sense, first the data of the study were coded. At this point, the researcher should analyze the collected data, divide them into meaningful parts and try to explain what each part means conceptually (Yıldırım & Şimşek, 2008). For this reason, code lists were created by the researchers through reading the data separately. The code lists were compared and different codes were discussed. Later on, it is necessary to find the themes which explain the data in general by considering the created codes (Yıldırım & Şimşek, 2008). The codes were gathered by considering the code lists created in this study and the themes were created by the researchers separately. At this point, the consensus in the evaluation of the researchers was calculated by using the formula set by Miles and Huberman (1994) as *Agreement Percentage = [Agreement / (Agreement + Disagreement)] x 100*. In this regard, it was decided that the agreement percentage of the researchers regarding the themes changed between 0,92 and 0,96. Later on, the themes were presented to the readers in an organized way. For the interpretation of the findings, the themes were presented on the basis of frequency (f) and percentage (%) by digitalizing the data. NVivo 10 software was employed in content analysis.

FINDINGS

The first research problem was determined as *“Do middle school students do sports in their free times?”*. It was determined that only 9 (7,69%) of the 117 participating students do not do sports in their free times. It was seen that the remaining 108 (92,31%) students expressed that they do sports in their free times. It was concluded with the following findings as a result of the analysis for determining which sports the students who said “I do sports” do in their free times. It was identified that both male and female students generally do the following sports; football, basketball, volleyball, chess and tennis. In addition to this, it was seen that swimming, running and table tennis are preferred by less students. It was determined that skipping rope, boxing, cycling, badminton, weight lifting and gymnastics are preferred by only one. According to this;

The second research problem was determined as *“What is ‘sports’ according to middle school students?”*. The findings appeared as a result of the collected data are as in the following.

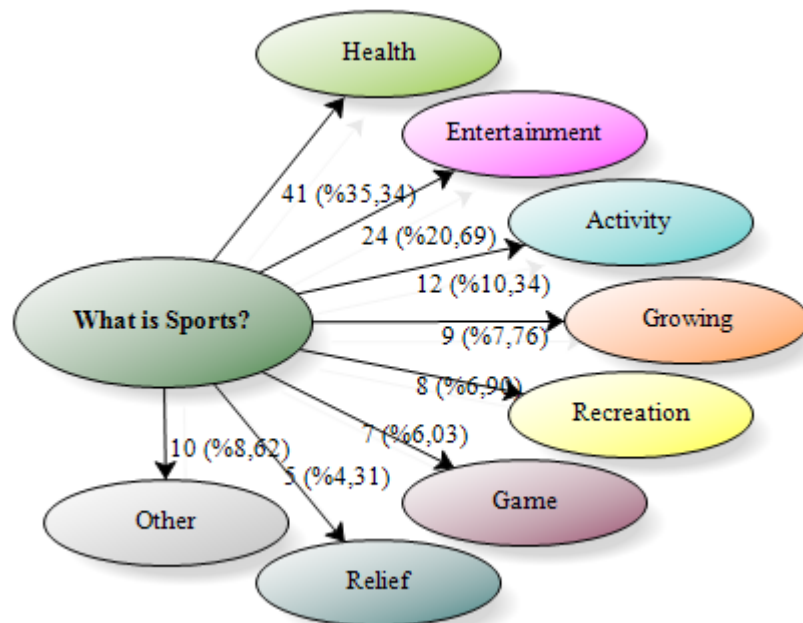


Fig. 1. What is sports?

When Figure 1 is analyzed, it is seen that middle school students stated their opinions about sports on seven different themes. In this sense, it was determined that middle school students express their opinions mostly on ‘health’ theme. It is seen that 41 (35,34%) students prefer expressions about health for defining sports. For example it was determined that they made definitions as in the following; *“Sports makes us to be healthy”, “Sports is a branch of health, it is health”, “When people do sports, they feel fresh, sports is health”, “The body and bones of a person who does sports develops and becomes healthier”, “For me, sports is both health and*

training”. After that, it is seen that students express their opinions on “entertainment” theme. It was determined that 24 (20,69%) students preferred expressions about entertainment for defining sports. For example it is seen that they made definitions as in the following; *“Sports is entertainment”, “It is natural and entertaining”, “For me, sports is having fun”, “Entertainment, an alternative for recreational activities”*.

When we continue to analyze Figure 1, it is seen that students express their opinions on the “activity” theme for the third place. It was determined that 12 (10,34%) students preferred expressions about activity for defining sports. For example, it was seen that they made definitions as in the following; *“Physical activities”, “Sports is doing entertaining activities”, “Sports is an activity which makes people feel good and at the same time which is necessary for the body”*. In addition to this, it was identified that students for the fourth place expressed their opinions on “growing” theme. It was seen that 9 (7,76%) students preferred expressions about growing. For example, the following expressions were used; *“For me, sports is the ability to improve oneself. People improve both their body and mind by doing sports. For example, if we play chess, we improve our mind and if we play basketball, we become taller”, “Sports is self-improvement”*. As for the fifth one, there were definitions which are suitable to recreation theme. For example, they made definitions as; *“For me, sports is doing recreational activities”*.

It was determined that students focused on the game theme for the sixth place. In this sense, it was seen that 7 (6,03%) students used expressions about game for defining sports. For example, they made definitions as in the following; *“Sports is a game”, “It is a game played for entertainment”*. 5 (%4,31) students preferred expressions about relaxing for defining sports. For example, there were expressions as in the following; *“It means feeling good for people and having fun. It is something for getting rid of all the tiredness and distracting mind”*.

When Figure 1 is analyzed, it is seen that the definitions of 10 (8,62%) did not fall into these seven themes. The fact that students have focused on different points about sports is the reason of this. For example, it was seen that they made definitions like; *“Sports is love which makes your soul young”, “I think sports is something good”, “For me, doing sports is about whether or not loving sports”*.

The third research problem was identified as *“What is “mathematics” according to middle school students?”*. The findings obtained as a result of the data analysis were given in Figure 2.

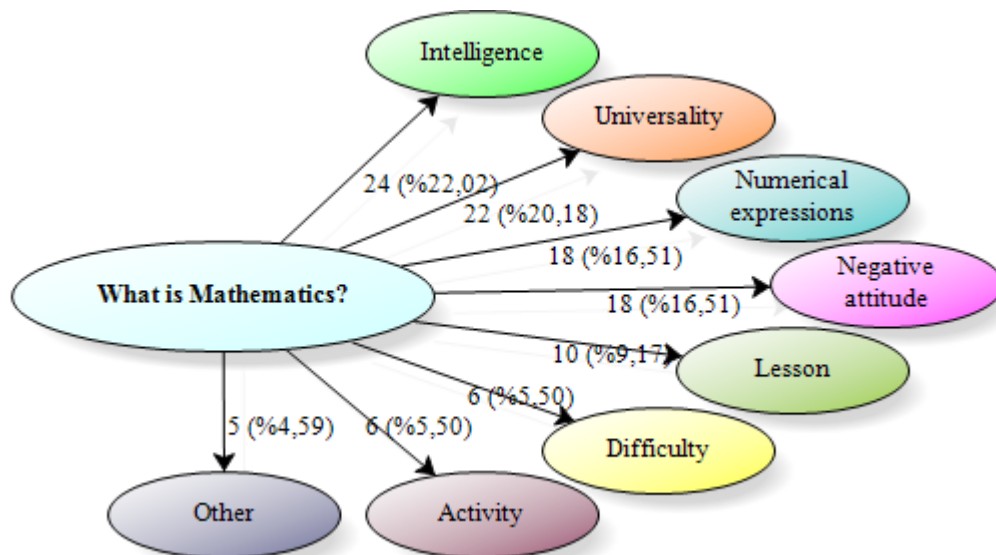


Fig. 2. What is mathematics?

When Figure 2 is analyzed, it is seen that the students give answers in seven different themes for the “what is mathematics?” question. In this sense, it was determined that 24 (22,02%) students focused on “intelligence” theme and preferred expressions about intelligence for defining mathematics. For example, it was seen that they made definitions like; *“For me it is a lesson which socially contributes our intelligence”, “It helps us to improve our intelligence”, “Mathematics improves our intelligence, displays our intelligence”, “It is a unit of intelligence”, “Mathematics is a lesson which reveals our intelligence”, “It is a mind game for brain”*. Later on, it was determined that 22 (20,18%) students emphasized “universality” theme and it was seen that students used

expressions about universality for defining mathematics. For example, they made definitions like; *“We use mathematics in most of the parts of our lives. There cannot be a world without mathematics”*, *“We need mathematics in every part of our lives”*, *“Our life and experiences are composed of mathematics, Mathematics is with us everywhere”*, *“Mathematics is always with us, against us in everything and everywhere”*.

When Figure 2 is analyzed, it is seen that 18 (16,51%) students focused on numerical expressions theme. In this sense, it was determined that students preferred definitions about numerical expressions for defining mathematics. For example, it was seen that they made definitions like; *“It consists of numbers”*, *“Mathematics is a lesson about numbers”*, *“Mathematics is a lesson which is carried out numerical operations”*, *“Mathematics is a lesson which has equation and numbers with algebraic expressions in it”*. It was determined the opinions of 18 (16,51%) students were related with “negative attitude” theme. It was seen that students used negative expressions for defining mathematics. For example, it was seen that they made definitions like; *“Mathematics tortures you”*, *“I hate mathematics and feel asleep”*, *“It is boring”*. It was determined that 10 (9,17%) students perceived mathematics as only a lesson. While 6 (%5,50) students discussed mathematics in difficult theme, 6 (5,50%) students discussed mathematics in activity theme. It is seen that the definitions of 5 (4,59%) students fall into other theme. When these definitions were analyzed, it was determined that they could not be related with other themes. For example, they made definitions like; *“Mathematics is a part of my comfortable breathing”*.

The fourth research problem was identified as *“Is there any correlation between “sports” and “mathematics” according to middle school students?”*. In this sense, the findings obtained are as in the following.

Table 1. Is there any correlation between sports and mathematics?

Grades	No comment	Yes	No	Total
5	1	10	6	17
6	0	16	13	29
7	1	24	9	34
8	0	18	19	37
Total	2 (%1,71)	68 (%58,12)	47 (%40,17)	117

When Table 1 is analyzed, it is seen that one student from the 5th and 7th grade did not answer the question stated as *“Is there any correlation between sports and mathematics?”*. It was determined that 10 of the 5th grade students said yes, 6 of them said no to this question, 16 of the 6th grade students answered as yes, 13 of them answered as no, 24 of the 7th grade students answered as yes, 9 of them answered as no and 18 of the 8th grade students answered as yes and 19 of them answered as no. When it is generally analyzed, it is seen that 68 (58,12%) students answered as yes and 47 (40,17%) students answered as no. Under the light of these findings, the answer of the fifth research question stated as *“How do middle school students perceive the possible correlation between mathematics and sport?”* is as in the following.

When the answers of students who thought (68; %58,12) that there is correlation between sports and mathematics were analyzed, it was determined that it was determined that 9 students did not make any explanation about the correlation in-between. It was seen that the answers of the remaining 59 students fell into 6 different themes. This can be seen in Figure 3.

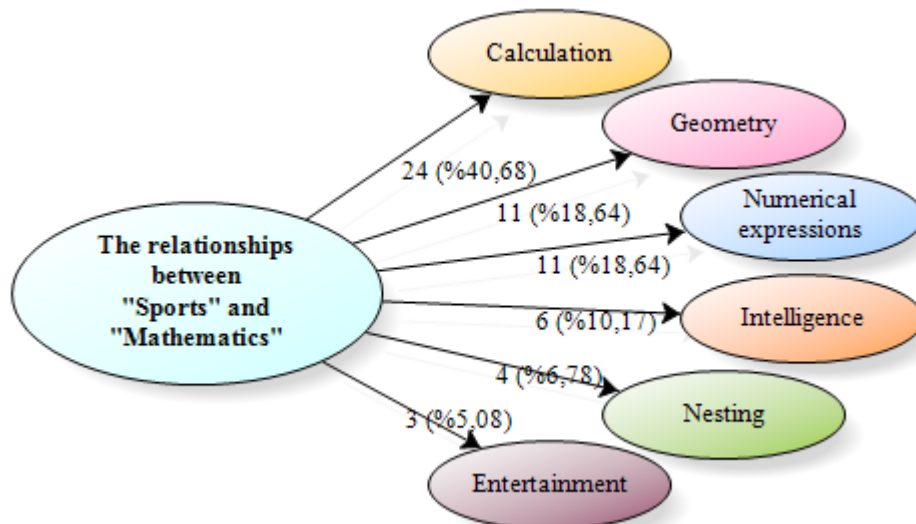


Fig. 3. The relationships between sports and mathematics

When Figure 3 is analyzed, it is seen that the correlation between mathematics and sports gathered into “calculation” theme. It was determined that 24 (40,68%) students focused on the expressions about calculation regarding the correlation in-between. For example, it was identified that they made definitions like; “*While playing volleyball, you calculate to which side you will throw the ball*”, “*You think that you will make a shot and you calculate the distance*”, “*While playing basketball or scoring in a game, we make calculations as in the mathematics lessons*”. Secondly, it was determined that they focused on the “geometry” theme. It was seen that 11 (18,64%) students used expressions about geometry for explaining the correlation in-between. For example, they made explanations like; “*We throw the ball according to angles while we are making a shot with the basketball*”, “*We use mathematics while doing sports. If we hit this ball to the wall, we can ask will it bounce back with a 60° angle?*”, “*When you say mathematics, first sports comes to my mind, because in sports, in football for instance, we should consider mathematics, because we consolidate the tactics with mathematics.*”

Similarly, it is seen that 11 (18,64%) students focused on numerical expressions theme for explaining the correlation in-between. For instance, the made explanations like; “*I think there is a correlation between them, because we use numbers in everything*”, “*It is accepted as I when you score in tennis, basketball, football etc and there are numbers in mathematics You throw the ball in volleyball and basketball and you score. This shows that there is a correlation between mathematics and sports*”. It was determined that 6 (10,17%) students focused on the theme about intelligence for explaining the correlation in-between. For example, they made explanations like; “*Chess is a sport. We improve our minds when we play it. While we are subtracting a number from another number, we use our mind. In other words, for me, there is a connection between them*”, “*For me, there is a connection between mathematics and sports, because sports require intelligence. For instance, when you are face to face with goalkeeper in football, if you don’t know what to do, you cannot do what you want*”.

It was identified that four (6,78%) students expressed that mathematics and sports are nested within each other for explaining the correlation in-between. It was seen that 3 (5,08%) students focused on entertainment theme. For example, it was determined that they made explanations like; “*For me, we do a kind of mind sports while solving mathematical questions. Besides, while doing sports, we do mathematics when calculating our goals, baskets and all our score. In addition to that, if we do not have mathematics and sports, the integrity of life is ruined*”, “*The have some common points, they are both entertaining*”.

CONCLUSION, DISCUSSION AND IMPLICATIONS

In this study, first whether or not middle school students do sports in their free times were analyzed. In this sense, it was appeared that most of the students participating in this study (92,31%) do sports. It was determined that they generally do sports like football, basketball, volleyball, chess and tennis. At this point, it can be said that the sports required by male students require a few equipments and for this reason they do sports more often.

Second in this study, it was aimed to find out how sports is perceived by middle school students. In this sense, it was appeared that middles school students explained sports with heath and entertainment themes. Sports can be defined within the scope of this study as “*all the movements that individuals do entertainingly for being healthy*”. Physical education lesson and sports activities are seen important in primary schools in terms of

improving motor skills of students, enabling them to acquire positive behaviors, providing them opportunities to put sports into their habitual actions (Yenal, Çamlıyer & Saracaloğlu, 1999). It can be said that students recognized this importance as they defined sports as health in this study. Özer and Aktop (2003) stated in their studies that people who participated in lifelong sports activities think that they will lead a healthier, happier and more qualified life. Sports is seen as the main education instrument for raising a healthy generation. In addition to this, the happiness of individuals depends on being completely and permanently healthy. In order for people to lead a healthy life, doing sports is seen very important (Yetim, 2000). As it is seen, the correlation between sports and health is significant. In this sense, it can be said that the result obtained in this study is supporting this correlation. In addition to this, it was seen that students focused on becoming thin in their definition of sports with health theme. It was determined that they defined sports as *“it is becoming thin for being healthy”*. It is known that inactive and sedentary life style increases the risk of obesity in children (Jago, Baranowski, Baranowski, Thompson & Greaves, 2005; Janz, Levy, Burns, Torner, Willing & Warren, 2002). In addition to this, it can be said that students perceived sports properly.

The other objective of this study is to find out how mathematics is perceived by middle school students. At this point, it was appeared that students defined mathematics with intelligence and universality themes. In this sense, mathematics can be defined in this study as *“numerical operations which individuals face with every moment of their lives and contribute to the improvement of their minds”*. In a study which was carried out by Şengül and Katrancı (2012a), it was concluded that elementary school students focused on universality of the mathematics. In addition to this, Şengül and Katrancı (2012b) founded out in their studies that prospective primary school mathematics teachers focused also on the universality of the mathematics. In this regard, it can be said that these studies are parallel. At this point, it is thought that the universality aspect of mathematics is a concept that can be used for explaining mathematics.

It is also aimed to discover in the study whether or not students who defined sports and mathematics think that there is a correlation between these two concepts. At this point, it was appeared that more than half of the students (58,12%) think that there is a correlation between sports and mathematics. When they were asked to define this correlation, it was appeared that students explained this correlation with calculation, geometry and numerical expression themes. In this sense, the correlation between sports and mathematics can be defined in this study as; *“There is a correlation between sports and mathematics. This connection requires calculation and geometry knowledge. Besides, the numerical expressions in sports are related with mathematics”*.

Taşmektepligil, Yılmaz, İmamoğlu and Kılıçgil (2006) concluded in their studies that sports did not have a negative effect on lessons. Saygılı, Atay, Eraslan and Hekim (2015) found in their studies that students who do sports regularly have better personal features in terms of being extrovert and open than student who do not do sports regularly. In addition to that they concluded that the academic achievements of students who have better personal features in terms of being extrovert and open are better than others. Tarakçı and Kaplan (2006) revealed that when social activities are added to the learning process of students with hearing impairments, it was appeared that they have more motivation for the learning process, they have more self-confidence, they participate in the lessons more, they have more fun and they develop positive attitudes like enjoying the lesson. In addition to this they also determined that they became more successful in mathematics lessons Field, Diego and Sanders (2001) expressed that sports activities contributed positively to the academic achievements of the students. It can be said from the result of this study which stated as *“there is a correlation between sports and mathematics”* that sports do not have a negative effect on the achievements of students in mathematics lessons. However, it is seen that this thought should be analyzed more extensively. Because, Akyüz (2013) found in his study that there is a negative correlation between mathematics and sports. For this reason, it is predicted that analyzing which lessons have a correlation with sports will contribute to the literature.

References

- Akyüz, G. (2013). Öğrencilerin okul dışı etkinliklere ayırdıkları süreler ve matematik başarıları arasındaki ilişkinin incelenmesi. *Elektornik Sosyal Bilimler Dergisi*, 12(46), 112-130.
- Bailey, R. (2006). Physical education and sport in schools: A review of benefits and outcomes. *Journal of School Health*, 76(8), 397-401.
- Demirhan, G. (2003). Kültür, eğitim, felsede ve spor eğitimi ilişkisi. *Spor Bilimleri Dergisi*, 14(2), 92-103.
- Erdemli, A. (1990). Hümanizma olarak spor. Spor Bilimleri I. Ulusal Sempozyumu Bildirileri. Ankara: Hacettepe Üniversitesi, 11-22.
- Erhan, S. E., & Tamer, K. (2009). Doğu anadolu bölgesi ilköğretim ve ortaöğretim okullarında beden eğitimi dersi için gereken tesis araç-gereç durumları ile öğrencilerin beden eğitimi dersine ilişkin tutumları arasındaki ilişkiler. *Atabesbd*, 11(3), 57-66.
- Erkal, M. (1978). *Sosyolojik açıdan spor*. İstanbul: Kutsun Yayınevi.

- Ertan, H. (2012). Spor fizyolojisi ve mekaniği. İçinde *Spor bilimlerine giriş* (Ed. H. Ertan). Eskişehir: Anadolu Üniversitesi Yayınları
- Erturan, A. G., & Göde, O. (2008). İlköğretim dördüncü sınıf öğrencilerinin bedensel/kinestetik zeka erişilerinin cinsiyet ve spor yapma durumlarına göre karşılaştırılması. *Spor Bilimleri Dergisi*, 19(1), 23-34.
- Field, T., Diego, M., & Sanders, C. E. (2001). Exercise is positively related to adolescents' relationships and academics. *Adolescence*, 36, 105-110.
- Fişek, K. (1983). *Devlet politikası ve toplumsal yapıyla ilişkileri açısından spor yönetimi*. Ankara: AÜ SBF Yayınları.
- Grössing, S. (1991). Beden-spor-hareket. I. Eğitim Kurumlarında Beden Eğitimi ve Spor Sempozyumu Bildiri Kitabı. Ankara, Milli eğitim Bakanlığı Okul İçi Beden Eğitimi Spor ve İzcilik Dairesi Başkanlığı, 47-54.
- Heper, E. (2012). Spor bilimleri ile ilgili kavramlar ve sporun tarihsel gelişimi. İçinde *Spor bilimlerine giriş* (Ed. H. Ertan). Eskişehir: Anadolu Üniversitesi Yayınları
- Hünük, D., & Demirhan, G. (2003). İlköğretim sekizinci sınıf, lise birinci sınıf ve üniversite öğrencilerinin beden eğitimi ve spora ilişkin tutumlarının karşılaştırılması. *Spor Bilimleri Dergisi*, 14(4), 175-184.
- Miles, M. B., & Huberman, M. A. (1994). An expanded sourcebook qualitative data analysis. London: Sage Publication.
- Jago, R., Baranowski, T., Baranowski, J. C., Thompson, D., & Greaves, K. A. (2005). BMI from 3-6 y of age is predicted by TV viewing and physical activity, not diet. *International Journal of Obesity*, 29, 557-565. doi:10.1038/sj.ijo.0802969
- Janz, K. F., Levy, S. M., Burns, T. L., Torner, J. C., Willing, M. C., & Warren, J. J. (2002). Fatness, physical activity and television viewing in children during the adiposity rebound period: The Iowa bone development study. *Journal of Preventive Medicine*, 35, 563-571. doi: 10.1006/pmed.2002.1113
- Kangalgil, M., Hünük, D., & Demirhan, G. (2006). İlköğretim, lise ve üniversite öğrencilerinin beden eğitimi ve spora ilişkin tutumlarının karşılaştırılması. *Spor Bilimleri Dergisi*, 17(2), 48-57.
- Kerkez, F. (2004). Geliştirilmiş oyun-egzersiz programının anaokulu çocuklarında lokomotor becerilere etkisi. *Spor Bilimleri Dergisi*, 15(2), 76-90.
- Kerkez, F. İ., Tural, V., & Akçınar, F. (2013). Okul öncesi dönemde beden imajı algısı ve beden memnuniyetsizliği. *Spor Bilimleri Dergisi*, 24(3), 234-244.
- Koca, C., Güven, B., Bulgu, N., & Demirhan, G. (2003). İlköğretim 8. sınıf kız ve erkek öğrencilerin beden eğitimi ders ortamındaki beden yaşantıları. *Spor Bilimleri Dergisi*, 14(4), 162-174.
- MEB (2015). http://ttkb.meb.gov.tr/meb_iys_dosyalar/2014_04/01092806_haftalikderscizelgesi_ilkorta.pdf adresinden 30.03.2015 tarihinde edinilmiştir.
- Özer, D., & Aktop, A. (2003). İlköğretim öğrencileri için hazırlanmış bir beden eğitimi dersi tutum ölçeğinin adaptasyonu. *Spor Bilimleri Dergisi*, 14(2), 67-82.
- Saygılı, G., Atay, E., Eraslan, M., & Hekim, M. (2015). Düzenli olarak spor yapan ve yapmayan öğrencilerin kişilik özellikleri ile akademik başarıları arasındaki ilişkinin incelenmesi. *Kastamonu Eğitim Dergisi*, 23(1), 161-170.
- Sunay, H. (1998). Spor yöneticilerinin nitelikleri ve eğitimi. *Beden Eğitimi ve Spor Bilimleri Dergisi*, 3(1), 59-68.
- Şengül, S., & Katrancı, Y. (2012a). İlköğretim ikinci kademe öğrencilerinin "matematik" kavramına ilişkin sahip oldukları metaforlar. *Eğitim ve Öğretim Araştırmaları Dergisi*, 1(4), 355-369.
- Şengül, S. & Katrancı, Y. (2012b). Metaphors that prospective primary school teachers possess on the concepts of "mathematics". *Procedia - Social and Behavioral Sciences*, 46, 1470-1475. doi: 10.1016/j.sbspro.2012.05.323
- Şişko, M., & Demirhan, G. (2002). İlköğretim okulları ve liselerde öğrenim gören kız ve erkek öğrencilerin beden eğitimi ve spor dersine ilişkin tutumları. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 23, 205-210.
- Tarakçı, G., & Kaplan, N. (2006). İşitme engelli öğrencilerde sosyal faaliyetlerin matematik başarısındaki etkileri. *Kazım Karabekir Eğitim Fakültesi Dergisi*, 13, 148-153.
- Taşmektepligil, Y., Yılmaz, Ç., İmamoğlu, O., & Kılıçgil, E. (2006). İlköğretim okullarında beden eğitimi ders hedeflerinin gerçekleşme düzeyi. *SPORMETRE Beden Eğitimi ve Spor Bilimleri Dergisi*, IV(4), 139-147.
- TDK (2015). http://www.tdk.gov.tr/index.php?option=com_gts&arama=gts&guid=TDK.GTS.5501b15525c365.85676759 adresinden 12.03.2015 tarihinde edinilmiştir.
- Yazıcı, A., G. (2014). Toplumsal dinamizm ve spor. *Uluslararası Türkçe Edebiyat Kültür Eğitim Dergisi*, 3(1), 394-405.
- Yenal, T., Çamlıyer, H., & Saracaloğlu, A. (1999). İlköğretim ikinci devre çocuklarında beden eğitimi ve spor etkinliklerinin motor beceri ve yetenekler üzerine etkisi. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*, IV(3), 15-16.
- Yetim, A. A. (2000). *Sosyoloji ve spor*. Ankara: Topkar Matbaacılık.

- Yıldırım, A., & Şimşek, H. (2008). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Yayıncılık.
- Yoncalık, O. (2009). İlköğretim altıncı sınıf öğrencilerinin beden eğitimi dersindeki başarılarına üç öğretim stilinin etkileri. *Selçuk Üniversitesi Beden Eğitimi ve Spor Bilim Dergisi*, 11(3), 33-46.

Open Science Gallery, A Self-Organising Team Building Approach For Transdisciplinary Group Interactions

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ABSTRACT

Open Science Gallery (OSG) is an interaction method and context for enabling knowledge creation which has emerged from our experience in supporting team building processes among transdisciplinary and geographically distributed researchers at our higher education institution.

The OSG works as a self-organising team building approach for designing and conducting group interactions across disciplines, providing participants with an open space for initiating shared, interest-based initiatives. It helps to bring people together, which possibly would not work together because of its different disciplines. These group interactions across transdisciplinary boundaries provide an open knowledge sharing where also learning from each other takes place.

The OSG is intended to be applied in face-2-face meetings, aiming to overcome discipline-related and physical boundaries and to initiate collaboration. The amount of participants is not limited, the method works for any size of people as long as they have the chance to meet each other in a room or hall at the same time.

To this end, the OSG presents an introductory question (OPEN) which serves for the participants as a starting point for sharing their personal expertise (SCIENCE) within a safe environment (GALLERY). The OSG is self-organising and spontaneous which means that no advance preparation for participants and little facilitation is required.

In this paper, we describe the need for such an approach which focuses on the specific challenge of multidisciplinary collaboration in research or education. We cover the terminology of the OSG and its methodological framework, as well as the potential for future developments and applications.

In the first part of this paper, we will describe the procedures of the OSG, its core elements, implementation steps and experiences made in the face-2-face pilot application. The second part covers the current development of the method, which also allows the integration of virtual participants. Furthermore, we describe the next development of the method, which will specifically be designed for virtual participants only.

INTRODUCTION

The complexity and diversity of today's challenges requires solutions that are beyond the scope of a single discipline or area of research. As a consequence, it is key to promote the collaboration of researchers from different disciplines and to enable them to perform an inter- and transdisciplinary creation of shared knowledge. Imagine a scenario in which you have a geographically distributed organisation with various autonomous research groups who never worked together and barely know each other. Where do you begin for promoting collaboration? In their model of organisational knowledge creation Von Krogh et al. (2000) emphasize five knowledge-creation steps, which are (1) sharing tacit knowledge, (2) creating concepts, (3) justifying concepts, (4) building a prototype, and (5) cross-leveling knowledge. Following this model, the first step in our mentioned scenario would be to "share tacit knowledge": and this is not easy. In fact, even after 20 years of knowledge management practice, tacit knowledge still seems too mysterious and is often ignored by managers because it cannot be controlled. But this is exactly what you should not do: rather than being controlled, knowledge creation needs to be enabled, and is in this similar to the growth of a plant, which also cannot be controlled but only "enabled" by appropriate cultivation. How to enable the sharing of tacit knowledge (step 1) and the creation of concepts (step 2) in the mentioned scenario? This is the question that we in our geographically distributed organisation had to address and that we answered by means of our approach of an Open Science Gallery, an interaction method and context for enabling knowledge creation (Von Krogh et al. 2000, 176 ff) by means of a face-2-face meeting with the purpose of building interdisciplinary teams around new ideas.

OSG TERMINOLOGY AND METHODOLOGY

The term OSG has a specific terminology, conveying the essence of our method in three words:

Open: the method focuses on conducting collaboration between multidisciplinary participants. Open means that there is no predefined team building process. Instead, the participants find each other based on shared *passion* and *interest*. An open question at the start of the OSG aims to facilitate the initial conversation among participants. From there, they decide themselves *on what* they want to work, *with whom* and *how long*.

Science: each participant is treated as an expert in his or her research field and invited to share his or her expertise with colleagues from other disciplines. The individual business cards with the personal competences of its owner help to find colleagues with same or similar interests. Thus, a topic can be examined from various perspectives. In this professional multiperspectivity lays a great strength of the OSG method.

Gallery: to support this driven by passion approach described above, the OSG should take place in a bright room with pin-boards, poster walls etc. as catalysers for social interaction and cross-disciplinary conversation. Participants should feel safe and protected while working out new ideas.

The OSG has its methodological roots in the “Design Thinking” process and the “Red Monkey Innovation Management” approach.

Design Thinking is a human-centred, creative, iterative and practical approach to innovation (see Brown 2008, p.8). based on inspiration, ideation and implementation as three interwoven stages (see Brown, 2009. p. 3). In our method we refer to this approach as follows: the participants develop collaboratively new ideas for projects, initiatives etc. Thereby, this process is creative and iterative since the participants continuously align these ideas with their individual interests. Thus, in the OSG format there is no particular outcome predefined for the group works. Ideas are allowed to be dynamic and can be adapted through the whole OSG process.

The second approach, to which the OSG is related, is Jef Staes (2014) “Red Monkey Innovation Management”. Here, Staes promotes the distinction between 2D and 3D organisations. While in 2D organisations the focus lays on diplomas and certificates for education and hiring, 3D organizations recognize the importance of passion and talents as keys to learning and working. While in 2D organizations we behave like sheep, just blindly following our job descriptions, the red monkeys in 3D organizations use their passion and talents to create innovation. Following Staes’ invitation, the OSG aims to support this 3D thinking approach by drawing on individual expertise rather than the given belonging to an organizational research group.

PROCEDURES OF THE OSG

The purpose of OSG is to build teams around new ideas; the themes of these ideas are free and the introductory question merely serves to initiate discussions. Therewith, the OSG is aligned with Nonaka’s et al. (2000) model of dynamic knowledge creation: the OSG aims to create new knowledge by bringing its participants in a socialising space together. Here they are invited to share their skills and passions and to go into a deeper dialogue to transcend tacit and explicit knowledge.

The following steps describe how to run an OSG:

1. Introducing an open question: an OSG starts with some explanations about the format and a predefined introductory question. This question should simply help participants to start conversations. A starting question which covers the meeting goal will help, for example: If you think about your skills and interests, to what project idea would you apply them?
2. Creating personal interest cards: Afterwards, each participant receives 5 business cards (including his/her picture, name and work-unit) to complete with keywords expressing his/her personal interests and competencies.

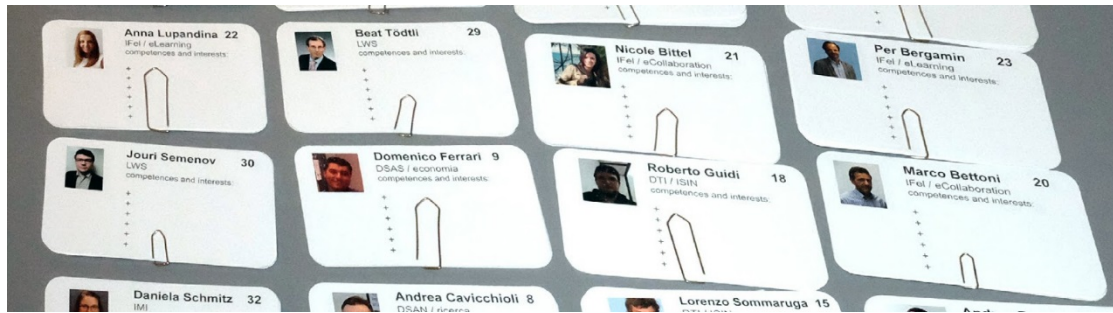


Figure 1: Business card preparation

3. Creating posters: Once the cards have been completed, participants are invited to manually create a poster using their input about the introductory question based on their own ideas. This is not a mandatory step, as there is no pressure to create something. Poster ideas can be input for projects, discussions or anything else. To do this, they choose a free pinboard and start writing or drawing.

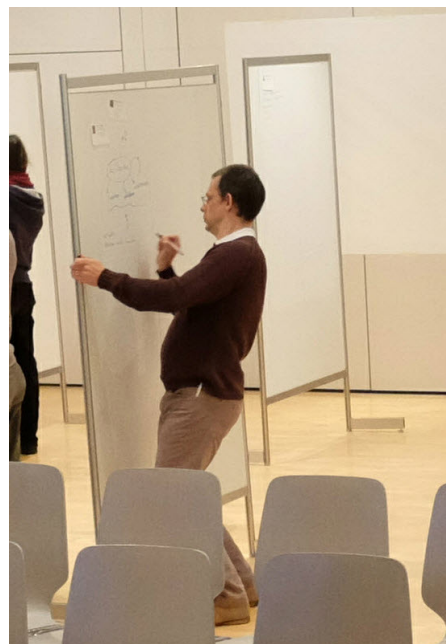


Figure 2: Individual creation of a poster

4. Visiting posters: The format doesn't distinguish between poster-owner and poster-visitor: All participants visit the posters and they pin one of their business cards to each poster they are interested in.



Figure 3: Poster visits

5. Building groups: The group building process is self-organised. Participants join the poster they would like to work on.
6. Working in groups: Once the interest groups have been established, they start working on their idea. It is up to the participants to change groups after 20 minutes or to create new groups for previously unused posters.
7. Visualising outcomes: Participants are invited to use a huge paper wall (1.50x3 metres) to write down their conclusions during their group work.
8. Presenting outcomes: At the end of the workshop, all groups briefly present their results to all participants and the next steps in-front of the paper wall.



Figure 4: Presentation in front of the idea wall

9. Creating final project teams: At this point, every participant is invited to join one or more groups for which he/she will continue to develop the idea as a member of the project team. For this, a business card must be tagged for every idea of interest. It is also possible to leave former working groups or even not to join a project-team..



Figure 5: Final Idea wall including businesscards of project members

Furthermore, the OSG creates a safe environment. This is particularly important for introverted people.

EXPERIENCES

The Swiss Distance University of Applied Sciences and its parent institution SUPSI (Scuola universitaria professionale della Svizzera italiana) are a geographically distributed organisation with various autonomous research groups. One of the instruments for fostering collaboration consists of an annual full-day face-2-face workshop between researchers of the two institutions. The workshop focuses on promoting cooperation and advancing social ties among geographically distributed researchers with professional and cultural differences and who, in many cases, never worked together and barely know each other. During the 5th edition of this research workshop which took place on October 24, 2014 in Brig (Switzerland) the OSG was applied and constituted the context of the main part of the meeting which opened with a keynote speech. This OSG was attended by 32 participants from 11 units; they created 22 posters, established 10 interdisciplinary groups and developed 4 project ideas (2 of which were later submitted for grant applications while the other two are still in progress).

Generally, participants liked the OSG due to its practical orientation and inspiring, energizing atmosphere. First of all, we found that participants loved to interact and to create ideas in the OSG context. They appreciate the method's openness by working on ideas which do not usually form part of their daily activities. Sometimes people seemed to feel abandoned; in this case the facilitators had to help them, being careful to find the right balance between free space and guidance, a key requirement for enabling social encounter. Furthermore, the idea wall turned out to be an appreciated context for sharing the outcomes of the group works. People liked this approach of having a shared interaction and knowledge space probably because it encouraged and nurtured conversation at a plenary level in a safe way.

We also learned from our pilot that the OSG process needs some improvements. Participants felt partially confused about what should be done as next. Here a solution could be an introduction to the OSG method and a detailed agenda of the steps displayed on a projector. The group building process must be simplified and user should be in some way better prepared for this step, for instance by giving a short introduction on the concept of self-organisation.

Finally, we will aim to better integrate introvert as well as low-creative participants in future. It turned out that giving participants a space for their ideas wasn't enough. Participants who have difficulty being outgoing and creative need a more sensitive approach.

CURRENT DEVELOPMENT

After the first application of the OSG method in fall 2014, we are about planning its further development. Given the fact that virtual communication and collaboration gains continuously in importance in terms of overcoming time- and space limitations, we aim to blend the face to face events with online parts throughout the following stages:

Preparation

We are all more or less involved in our daily business activities. Thus, we all know how challenging it is to catch participants before an event and to engage them in pre-workshop activities. Hence, we are confident to increase participants' engagement by bringing them virtually together. To this end, we invite them to join our workshop group on LinkedIn (<http://www.linkedin.com>) where they are asked to introduce themselves and to share insights into their daily activities with other colleagues. Thanks to the advantages of the asynchronous forum, the participants can decide themselves, *when* and *from where* to respond and to contribute to the discussion. Furthermore, the forum gives participants the opportunity to start discussions on new and other topics driven by their personal interests.

Implementation

Beside this option of preparing the event with the help of virtual communication, we plan 2015 for the first time a virtual keynote at the face to face event. Eddie Obeng will talk about new challenges for learning. He is going to use his own 3D platform-environment Qube (<http://qube.cc/>). While our workshop coordinator is logged in on Qube, the participants are able to follow Obeng's keynote speech via beamer and sound system. Participants can write their upcoming questions directly during the talk into etherpad (<http://www.titanpad.com>), a collaborative writing tool). Thus, Obeng can immediately respond to them. The titanpad is also used for capturing the outcomes of small group activities during the keynote which are initiated by Obeng himself. This way, we can make sure that the audience can interact with the keynote speaker even if he is not sitting in the same room.

Thereby, there are several technical aspects, you need to make sure, before running a keynote talk online:

- The internet connection: you have to make sure the internet connection is stable and reliable.
- The audio settings: there is nothing more annoying for participants than a bad audio while listening to a virtual presentation. That's why the audio needs to be of high quality.

Both, internet connection and audio, should be tested (ideally more than once) before the event for sound quality and audio-feedback.

Follow-up

Again, as soon as the face to face event is over, participants are already back again in their daily business and there is not much time left to devote to the past workshop. Also here, virtual forms of interaction may help to extend the event's effects. That's why we plan for our next research workshop in October 2015 to organize follow-up activities on the online platform Qube. Participants will be invited to join a virtual session on Qube one or two weeks after the face to face workshop. During this session, participants can reflect and discuss about the content and format of the event, the outcomes of the group works, planned activities, next steps etc.

This kind of virtual follow-up gives participants the chance to meet each other again without being too much interrupted in their daily activities (particularly by a long travel). Furthermore, this virtual meeting can be the starting point for ongoing interactions and collaboration among participants.

Outlook

This is, how we plan to realize this year's workshop. Nevertheless, the question remains, how to organize the virtual communication, especially *before* and *after* the event in order to reach the best and highest possible participants' engagement. We assume that we need to try various approaches and tools in future to find out which ones are working best. We also think about the option to organize some of our events completely virtual in future as described below.

FUTURE DEVELOPMENT

The OSG method is not limited to face-2-face meetings. It is conceivable that the same could also be completely carried out virtually. In a virtual world like second life or Qube all necessary options are already available today. Participants are free to move in such virtual worlds and when they are close enough they can even talk to each other. You can form groups and immediate content can be provided and presented in tables or flip charts.

What we need to change, is the time frame. No one wants to stay an entire day in a virtual world, but up to two hours at a time are quite possible. The complete sequence of OSG can also take place in small stages over several days or at selected times. What may appear to such scenarios has yet to be researched and developed. New technologies for virtual and augmented reality will appear soon on the market, such as the holo-lens from Microsoft or the oculus rift from Facebook. This will bring also new opportunities into play.

CONCLUSION

We designed the OSG as an interaction method and context for enabling a shared knowledge creation in inter- and transdisciplinary teams. We applied the OSG method in the framework of an annual one-day workshop where researchers from different institutions and various disciplines meet face to face to build interdisciplinary teams around new ideas. It was important to us to give participants the freedom to decide themselves with whom they want to work and on what. Hence, we applied Staes' *driven by passion* approach for our new interaction format. In the OSG, teams are built spontaneously based on shared interests. The first implementation of the OSG has confirmed the importance of this format's openness as participants started to build groups *across their own discipline* themselves. Furthermore, the outcomes of these group works in terms of project ideas and submissions highlighted the lasting effects of such an approach.

From the first implementation round we also learned how critical it is to guide participants through the OSG process. Even if the format focuses on self-organisation, most of the participants need some support and step-by-step instructions on how to collaborate and develop common ideas in a new way. Thus, we recommend to set up a clear agenda and to guide the audience through each of its points. Although the facilitation is reduced to a minimum in the OSG, the facilitator has to be present in the background.

This need of a reliable guidance by the facilitator might be even more critical for accompanying online interactions. As we plan to carry out this year's workshop by blending online and face to face communication, we need to devote time to get to know our audience: not each participant is familiar with online tools and how to use them. Also listening to a virtual keynote while sitting in the same room with other colleagues may feel strange to one or the other participant. Thus, it will be crucial to run the keynote without technical problems for avoiding frustration and inhibitions. To this end, a clear and stable connection and audio need to be guaranteed.

With this in mind, we aim to realize also completely online workshops in future. We are convinced that the OSG can be applied in a 100% virtual setting.

However, considering these 3 OSG applications presented in this paper, there are some limitations for each of them to keep in mind:

face to face

Face to face meetings require a lot of time and cause interruptions from the daily activities. For our annual face to face workshops researchers have to travel for each way more than half a day. Thus, face to face meetings can be rather ineffective. However, this kind of meetings make sense by all means especially if your audience is going to meet for the first time.

blended

If you decide to mix virtual and face to face formats you might need to be aware that your greatest challenge might be to motivate participants to take part in pre- and after event activities. We consider that giving participants as much flexibility as possible to contribute to these activities is one of the keys to their engagement.

online

For running a virtual workshop participants need to be familiar with concepts of e-collaboration. They need to feel capable to use the tools and technology. In addition, a fully virtual implementation might be not the first choice for participants who don't know each other yet. For this case a face to face meeting can be more effective, especially for establishing a first and personal contact.

References

- Brown, T. (2009) Change by Design. How Design Thinking Transforms Organizations and Inspires Innovation, HarperBusiness, <http://bit.ly/1DneXml>.
- Brown, T. (2008) Design Thinking, Harvard Business Review, [online], <http://bit.ly/1Iie5x2>.
- Nonaka, I., Toyama, R., & Konno, N. (2000) „SECI, Ba and leadership: a unified model of dynamic knowledge creation”, Long range planning, 33(1), 5-34.
- Obeng, E.: Business Educator - World Class Motivational Speaker - Author - Entrepreneur [online], <http://pentacle.co.uk/eddieobeng.htm> (28.06.15).
- Staes, J. (2014) “No Sheeping. Organizations in Search of New Balance”, handout at the 5th SUPSI meets FFHS Research Workshop, Brig, October 24 2014.
- Von Krogh, G., Ichijo, K. & Nonaka, I. (2000) Enabling Knowledge Creation. Oxford: Oxford University Press.

Opinions Of The Secondary Education Teachers On The Classroom Management Competences

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ABSTRACT

This study is realized to determine the opinions of the teachers who work in the secondary education schools affiliated to the Ministry of National Education on classroom management competences, then to make suggestions to those concerned regarding this subject. “747 teachers” who work in “24 secondary education schools” in total which are public and private and in Beylikduzu district, Istanbul province in 2013-2014 school year constitute the population of the study. 20% of the teachers, that is 149 teachers, who constitute the population are selected as the sample group with the method of “Simple Random Sampling.” 109 surveys which are conducted on the sample group, that is 73,15% of them, are returned and evaluated. This rate is equal to the 14,59% of the population. For the purpose of determining the teachers’ opinions, “the Ways to Achieve Discipline in the Classroom” survey which is developed by Gulsen in 2011 with five point likert type, and reviewed and rearranged for this study, and of which the total Cronbach Alpha reliability coefficient is calculated as 0,85 is used. The acquired data is evaluated and interpreted in the sub-dimensions of “Direct Discipline” and “Indirect Discipline”. During the analysis of the acquired data; SPSS package program is used, percentage (%) and frequency (f) and arithmetic mean (\bar{x}) are included. When the statistical result of the acquired data is considered, it has been determined that the teachers use “Direct Discipline” methods “rarely” ($\bar{x}=2,28$) and “Indirect Discipline” methods “sometimes” ($\bar{x}=3,09$) in the classroom management practices. When the results are evaluated in general, it is suggested that period trainings should be included to increase the teachers’ competences regarding modern classroom management models which provide them with indirect discipline.

Keywords. Classroom Management, Teacher, Discipline, Education, Secondary Education.

INTRODUCTION

The sense of discipline has great importance for the students to grow up as amicable individuals. For this purpose, first of all, how the discipline problems are evaluated and how the discipline in the classroom is provided should be known. Student discipline in the education institutions is one of the most important managerial activities in the schools (Gundogdu, 2007: 9). Disciplining the secondary education students is more difficult compared to the other education institutions. The students reaching puberty, the students being influenced by their peers, the obligatory changes in the communal life may have an effect on the students as for them to tend towards the behaviours which cause indiscipline (Helvacı, 2014: 144).

Disciplining the students does not only mean making sure they sit silently. However, in practice, it is seen that it is perceived as students obeying to the teacher’s authority, the students to be free as it is allowed. Since the situation is like this, to be able to see if there is a difference between theory and practice and to shed a light on the subject by asking the teachers in the classroom to get their opinions is of great importance. In regard to this importance, this study has been deemed necessary to be realized for the purpose of “determining the opinions of the teachers who work in the secondary education schools affiliated to the Ministry of National Education on classroom management competences, then to make suggestions to those concerned regarding this subject.”

With the object of learning the teachers’ opinions on the classroom management competences, it is deemed appropriate early on to form a conceptual frame and clarify the class and discipline concepts. In its most plain meaning, the classroom is *defined as* each of the sections in which students are separated according to their yearly education. It is all the common life areas in which the education activities are realized. These areas may be all places that are suitable to education. For an environment with such flexibility to be able to controlled, for

students with many different qualities to be gathered around common purposes and disciplined, there is a need for special skills and techniques. These special techniques and skills put forward classroom management concept (Akan, 2014: 2).

Classroom management may be defined as the effort to establish an environment (in-classroom and out-of-classroom) suitable to education for the purpose of reaching the educational success expected ultimately and for the realization of an efficient education period in the classroom (Akan, 2014: 2-3; Eren, 1991:345; Basar, 1999: 92; Helvacı, 2014: 144).

The classroom management concept is usually associated with the discipline concept which mostly cause misunderstanding. Discipline is accepted as the process of guiding some interests, wants and reactions for the purpose of providing adaptation of an individual to the social rules or ensuring that the individual reaches an ideal value, preventing undesirable behaviours and behaviours which are seen negatively in an individual and getting an individual to adopt the habit of controlling and directing the inner reactions (Akan, 2014: 2-3, Bilir, Kuru ve Tezcan, 2007: 22; Gülşen, 2014:163-164 ; Helvacı, 2014: 144; Özcan, 2008: 41; TDK, 2015: 1). However, in practice, discipline concept is generally used and performed as if it is synonymous with “punishment” concept. Whereas punishment is just a small part of the discipline concept. Discipline should be seen as a medium used to prevent the reaction arising out of the disruptive behaviour when amendatory and guiding attempts do not bring a positive result. It should not be seen as a medium resorted to provide direct and indirect control (Akan, 2004: 2-3, Bilir, Kuru and Tezcan, 2007: 22; Budak, 2009: 6-7; Celep, 2008: 240; Helvacı, 2014: 144; Ozcan, 2008: 41).

When we look at the definitions of the discipline in the classroom management, we see that it is associated with concepts such as undesired behaviour, teacher reactions, self-control of the student, applying of the rules, establishing the education environment, participation to the suitable education activities, increasing the education time, teaching responsibility and management models (Guclu, 2004: 12; Kiran and the others, 2008: 239; Sarpkaya and the others, 2011: 82; Satoglu, 2008: 4). Since it is like this, it is of great importance to teach teachers the classroom management practices since they are the leading player in a class environment. Sense of management in a school and personalities and professional perceptions of teachers are determinative in discipline practices. What kind of attitude a class teacher develops towards a student who acts in an undesirable way in the classroom and in what kind of sense of discipline a class teacher approaches to a student who acts in an undesirable way in the classroom differ according to the sense of management in a school and the personal characteristics of teachers. Discipline problems are behaviours which affect and interfere with educational purposes, plans and activities negatively and exploit and neglect the common rights of students and teachers. The purpose of discipline systems is to approach to the victims of uncontrolled behaviours carefully and set in motion those who act in an over-controlled way (Aktaş, 2010: 8-10; Boyraz, 2007, 30-33; Budak, 2009: 7-10; Celep, 2008: 240; Çerçi, 2009: 7-8; Gülşen ve Gökçer, 2015: 4-5).

The sense of discipline in schools is of great importance for the youngsters in schools to grow up as amicable individuals. For this purpose, first of all, how the discipline problems are evaluated and how discipline is provided in the classroom should be known. How to discipline students when their personality developments start to settle in adolescence period is more important. Student discipline is one of the most important managerial activities in all education institutions. In this case, sense of discipline should be explained.

Sense of Discipline

Recently, there have been some changes in our sense of discipline and our perception of a disciplined classroom. In the past, the primary criteria in discipline was silence and it was tried to be ensured with an excessive authoritarian method. Nowadays this understanding gives its place to an understanding in which the class atmosphere becomes less oppressive. In today’s education, according to the class and the applied methods, for students to talk in a low voice, even to walk around in the classroom during the lecture are approached more tolerantly (Aktaş, 2010: 29-31; Ciftci, 2008: 34).

In the classroom environment, teachers sometimes adopts direct discipline methods, and sometimes, they adopt indirect discipline methods to discipline. For the teacher to use constructive discipline, inhibitive discipline and corrective discipline practices helps to prevent the discipline problems during education to a considerable extent (Akar, 2006:22-29; Boyraz, 2007, 30-46; Ciftci, 2008: 34).

Constructive Discipline: It is a practise for preventing discipline problems before they arise. Because preventing a problem after it arises is more difficult than preventing it before it arises. This method is so that the discipline problems do not arise: it includes the precautions to prevent a discipline problem from arising. In these

kinds of discipline approaches, “the personality of the teacher” has great importance, and this personality requires an efficient and effective profession knowledge (Dogru, 2005: 19; Eleser, 2007: 9).

In constructive discipline subject for discipline problems not to arise, the matters that the teachers should regard are listed below (Gunden, 1979: 375; Yilmaz, 2007: 34):

- Discipline should be built on “dos” more than “don’ts”.
- Studies should be based upon teacher-student cooperation.
- Students should be self-aware about discipline.
- Students should be kept an eye on so that they do not loaf around.
- Students’ personalities should be respected.
- Tools and materials should be used during classes.
- Students should be helped so that they comprehend that the things they do are beneficial.
- The situations which may cause a problem should be analyzed and the reasons for them to cause problems should be found out.

Preventive (Inhibitive) Discipline: It is the understanding of making the arrangements of the formations regarding classroom and school rules so that the students do not meet with any negativity from the start. In a way, it can be said that it is the understanding of putting a person in a bell glass. The main purpose in the preventive discipline is actually to ensure a person to self-discipline himself or herself without an influence from outside. That’s why, the participation of the individual is required for the rules to be constituted (Boyraz, 2007, 47-48; Ucar, 2008: 29).

This sense of discipline foresees the discipline problems which may arise in the classroom. Therefore, it includes practices to prevent these kinds of behaviours before they arise. So it is an approach to prevent the problems that may occur in the future. When the modern classroom management understandings are analyzed, one of the most considered qualities is the understanding of determining a problem before it arises and taking preventive precautions. Even though it is not possible to prevent all problems with this understanding, it can minimize the amount of which the problem occurs and the reflection width. Since the problems can be prevented in this way, it is possible to take a step towards preventing the occurrence of the problem behaviours (Boyraz, 2007, 47-48; Esen, 2006: 31-32).

In this approach, teachers should regard to these matters (Binbasioglu, 1991: 327; Boyraz, 2007, 47-48; Gunden, 1979: 381; Yilmaz, 2007: 35-36):

- Students’ names should be known. When a student feels mental stress, it relaxes to call out to him/her with his/her name a little.
- The way the students sit should be taken into consideration. If two mischievous children sit next to each other, it may be useful to change their places at the earliest opportunity without offending them.
- A sincere and serious behaviour should be exhibited during lectures. When a teacher acts in this way, there is less discipline problem in classrooms.
- Calmness should be preserved when one student or a few students break the discipline in the classroom, no problem should be aroused until the end of the class, the students should be taken to a room and talked.
- The students should be cared one by one. Teachers should look for a remedy for their private problems, and should not reveal their weaknesses by displaying excessive anger in front of the students.
- Indecisive and surprised states should be avoided. Teachers should be determined in front of the students.
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Corrective Discipline: In the event that although preventive precautions are taken and a discipline problem still arises, taking precautions for ensuring that this problem does not arise again is called corrective discipline. For example, reminding to a student who fights with his friends that his/her behaviour is wrong, warning him/her, making sure he/she apologizes, if he/she does it again, to punish them can be shown as an example to this discipline type (Guner, 2009: 10; Ozdem, 2003: 12-13; Yilmaz, 2007: 35-36).

This approach concentrates on preventing the problems and stressful situations that may arise with teaching skills and disposing of them by becalming it before it gets bigger. If the student commits an offense again despite all preventive efforts, the purpose is to prevent the student from committing an offense again (Baysal, 2009: 19; Boyraz, 2007, 49-50).

According to the corrective discipline approach, the matters the teachers should take into consideration towards the students who commit an offense in schools are explained as below (Boyraz, 2007, 49-50; Gunden, 1979: 383; Yilmaz, 2007: 35-36):

- A student who commits an offense should not be punished in front of his/her friends.
 - A student who commits a serious offense should be kept away from his/her friends starting from the moment he/she commits the offense.
 - The student should not be forced to apologize.
 - After the problem disappears, it should not be reminded and emphasised.
 - Teachers are not authorized to dismiss students from the classroom, suspend them from the school.
- Therefore, they should not do it.
- Small incidents should not be exaggerated.

The sources of discipline problems should be known to be able to behave accordingly to the discipline approaches and to be able to solve the discipline problems. When the reasons of the undesired behaviours and discipline problems in the classroom are analyzed, it is seen that there are some in-class and out-of-class reasons. As out-of-class factors, school, environment and family factors become prominent; the factors caused by teachers, students and environments become prominent as in-class factors (Aydoğan, 2015: 200). 20% of the time spared to education in the classroom spent to eliminate the discipline problems. Bearing this in mind, the reasons of these problems should be determined clearly and the teachers' opinion on this should be found out (Aksoy, 2003; 13-15; Kayabaşı ve Cemaloğlu, 2007:149-170; Sirkeci, 2010: 13). The findings acquired from this study, which is realized from the necessity of the teachers' opinions regarding discipline in classroom environment, of knowing whether teachers resort to "direct discipline methods" or "indirect discipline methods", and of learning how they include the practices on this matter, are stated below.

METHOD

General scanning model is used while this study, which is realized for the purpose of determining "the opinions of the teachers who work in the secondary education schools affiliated to the Ministry of National Education on classroom management competences", then to make suggestions to those concerned regarding this subject, is conducted. For the purpose of determining the teachers' opinions who work in the secondary education schools, "Achieving Discipline in the Classroom" survey which is developed by Gulsen (2014) is used.

Population and Sample

"747 teachers" who work in "24 secondary education schools" in total which are public and private and in Beylikduzu district, Istanbul province in 2013-2014 school year constitute the **population** of the study (Aras, Şimşek ve Kakırman, 2014: 19). 20% of the teachers, that is 149 teachers, who constitute the population are selected as the **sample** group with the method of "Simple Random Sampling." 109 surveys which are conducted on the sample group, that is 73,15% of them, are returned and evaluated. This rate is equal to the 14,59% of the population.

Table 1. Frequency (f) and Percentage (%) Distributions of the Sample Group regarding Participation to the Survey

Sample Group	The People who				TOTAL	
	Respond to the Survey		Do not Respond to the Survey			
	f	%	F	%	f	%
The Teachers who Work in Beylikduzu District Secondary Education Schools	109	73,15	40	26,85	149	100

Data Collection, Analysis and Interpretation

In the study, primarily, the related literature review is realized, afterwards, the opinions are determined through the survey. For the purpose of determining the opinions, "the Ways to Achieve Discipline in the Classroom" survey, which is developed by Gulsen in 2011 with five point likert type, and reviewed and rearranged for this study, and of which the total Cronbach Alpha reliability coefficient is calculated as 0,85, is used.

The weights given to the agreeing rates to the propositions in the survey which is developed with five point likert type and the limits of these weights are defined as "Never: 1.00-1.80", "Rarely: 1.81-2.60", "Sometimes: 2.61-3.40", "Usually: 3.41-4.20", "Always: 4.21-5.00". During the analysis of the acquired data; SPSS package program is used, percentage (%) and frequency (f) and arithmetic mean (\bar{x}) are included. The acquired data is evaluated and interpreted in the sub-dimensions of "Direct Discipline" and "Indirect Discipline".

FINDINGS AND COMMENTS

With the research, the findings below are acquired. The acquired findings of the study are placed in the tables, and thus, the ways to achieve discipline are commented on and evaluated in the light of secondary school teachers' opinions.

Table 2. Data on Teachers' Opinions regarding "Direct Discipline" Dimension of the Achieving Discipline in the Classroom Survey

No	PROPOSITIONS	AGREEING RATE			
		Gn	Total		\bar{x}
			f	%	
1	To achieve discipline in the classroom, I talk with the student right away in front of his/her friends.	F	57	52,29	2,88
		M	52	47,71	3,42
2	To achieve discipline in the classroom, I talk with student after the class.	F	57	52,29	3,73
		M	52	47,71	2,88
3	To achieve discipline in the classroom, I warn the student with body language. (For example, I frown, nod, make eye contact with the student)	F	57	52,29	3,85
		M	52	47,71	3,96
4	To achieve discipline in the classroom, I gently touch the student's arm or shoulder.	F	57	52,29	2,05
		M	52	47,71	2,54
5	To achieve discipline in the classroom, I change where the student sits.	F	57	52,29	3,08
		M	52	47,71	2,21
6	To achieve discipline in the classroom, I do not let student go out in recess.	F	57	52,29	1,23
		M	52	47,71	1,21
7	To achieve discipline in the classroom, I do not let student participate in fun class activities.	F	57	52,29	1,42
		M	52	47,71	1,50
8	To achieve discipline in the classroom, I make the student stand on one foot.	F	57	52,29	1,19
		M	52	47,71	1,13
9	I scold the student who disturbs the peace of the class to achieve discipline in the classroom.	F	57	52,29	2,12
		M	52	47,71	2,42
10	To maintain discipline in the classroom, I punish the student who causes the problem physically.	F	57	52,29	1,23
		M	52	47,71	1,58
Direct Discipline Ways in Total		F	57	52,29	2,28
		M	52	47,71	

*"Never:1.00-1.80", "Rarely:1.81-2.60", "Sometimes: 2.61-3.40", "Usually: 3.41-4.20", "Always: 4.21-5.00"

When Table 2 is analyzed, it is seen that the teachers who participate to the survey agree with the propositions in the subject of "direct discipline ways" in "rarely" level ($\bar{x}=2,28$) with regard to the general arithmetic mean. It can be said that the teachers who participated to the survey do not want to use direct discipline methods in the classroom management practices. When the topics are evaluated separately, it is seen that the proposition which the female teachers with $\bar{x}=3,96$ arithmetic mean and male teachers with $\bar{x}=3,96$ arithmetic mean agree with in "usually level" on the highest rate is the proposition of "To achieve discipline in the classroom, I warn the student with body language. (For example, I frown, nod, make eye contact with the student)". The least agreement reached proposition, for female teachers with $\bar{x}=1,19$ arithmetic mean, and for male teachers with $\bar{x}=1,13$ arithmetic mean in "never" level, is "To achieve discipline in the classroom, I make the student stand on one foot."

Table 3. Data on Teachers' Opinions regarding "Indirect Discipline" Dimension of the Achieving Discipline in the Classroom Survey

No	PROPOSITIONS	AGREEING RATE			
		Gn	TOTAL		\bar{x}
			f	%	
1	To achieve discipline in the classroom, I ignore the undesired behaviour.	F	57	52,29	2,58
		M	52	47,71	2,21
2	To achieve discipline in the classroom, I try to divert the student's attention to something else.	F	57	52,29	2,96
		M	52	47,71	2,54
3	To achieve discipline in the classroom, I send the student to the school principals right away.	F	57	52,29	1,81
		M	52	47,71	1,50
4	To achieve discipline in the classroom, I make contact with the school counselling service and collaborate with them.	F	57	52,29	3,19
		M	52	47,71	3,08
5	I make contact with family of the student who disturbs the discipline of the class.	F	57	52,29	2,65
		M	52	47,71	2,67
6	I pay attention to set the rules, which are to be obeyed in the classroom, in a clear and an understandable way.	F	57	52,29	4,08
		M	52	47,71	4,00
7	To maintain discipline in the classroom, I benefit from the approaches to achieve discipline.	F	57	52,29	3,46
		M	52	47,71	3,42
8	To achieve discipline in the classroom, I use a sufficient amount of teaching tool related to the class.	F	57	52,29	3,77
		M	52	47,71	4,00
9	I perform teaching practices which are suitable to the to the students' level of development during the class.	F	57	52,29	3,88
		M	52	47,71	3,92
Indirect Discipline Ways in Total		F	57	52,29	3,09
		M	52	47,71	

*"Never: 1.00-1.80", "Rarely: 1.81-2.60", "Sometimes: 2.61-3.40", "Usually: 3.41-4.20", "Always: 4.21-5.00"

When Table 3 is analyzed, it is seen that the teachers who participate to the survey agree with the propositions in the subject of "indirect discipline ways", in "sometimes" level ($\bar{x}=3,09$) with regard to the general arithmetic mean. It can be said that the teachers who participated to the survey sometimes use indirect discipline methods in the classroom management practices. When the topics are evaluated separately, it is seen that the proposition which the female teachers with $\bar{x}=4,08$ arithmetic mean and male teachers with $\bar{x}=4,00$ arithmetic mean agree in "usually" level on the highest rate with is the proposition of "I pay attention to set the rules, which are to be obeyed in the classroom, in a clear and an understandable way." Besides this, it is seen that the male teachers agree in "usually" level on the highest rate with the proposition of "To achieve discipline in the classroom, I use a sufficient amount of teaching tool related to the class." with $\bar{x}=4,00$ arithmetic mean. It is seen that the least agreed proposition, for female teachers with $\bar{x}=1,81$ arithmetic mean and for male teachers with $\bar{x}=1,50$ arithmetic mean in "never" level, is "To achieve discipline in the classroom, I send the student to the school principals right away."

RESULTS AND RECOMMENDATIONS

Results

The following results are reached as a result of the research findings:

It is seen that the teachers use "Direct Discipline" methods "rarely"; "Indirect Discipline" methods "sometimes" in classroom management practices. Teachers also state that they use direct discipline achieving methods very rarely in the classroom management practices.

Both female and male teachers state that to achieve direct discipline they mostly use this method: "To achieve discipline in the classroom, I warn the student with body language. (For example, I frown, nod, make eye contact with the student)".

Both female and male teachers state that they "never" use this method: "To achieve discipline in the classroom, I make the student stand on one foot."

Teachers state that they “pay attention to set the rules, which are to be obeyed in the classroom, in a clear and an understandable way”, and that they do not “send the student to the school principals right away” to achieve indirect discipline.

Recommendations

Based on the research results, the recommendations below are deemed suitable.

- For teachers to achieve indirect discipline, periodic trainings that can increase their efficiency in modern class management practices should be included.
- For the purpose of getting the support of all partners who are effective in the class management activities, common events with their participation will be beneficial.
- For research to reach more general results, all other partners’ opinions should be taken, too.

References

- Akan D. (2014). “Temel Kavramlar ve Sınıf Yönetiminin Kapsamı” Kuram ve Uygulamada Sınıf Yönetimi (Ed. Celal GÜLŞEN). Ankara: Anı Yayıncılık.
- Akar, N. (2006) Ortaöğretim Kurumlarında Karşılaşılan Disiplin Sorunları ve Eğitim Yöneticilerinin Çözüm Yaklaşımları. Denizli: Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Yayınlanmamış Yüksek Lisans Tezi.
- Aktaş, M. (2010) İlköğretim 1. Kademe Görev Yapan Öğretmenlerin Sınıf Kurallarının Uygulanması ve Değerlendirilmesine İlişkin Görüşleri. Yüksek Lisans Tezi, Yeditepe Üniversitesi, Sosyal Bilimler Enstitüsü.
- Aydoğan, İ. (2014). “Sınıfta İstenmeyen Davranışların Yönetimi”. Kuram ve Uygulamada Sınıf Yönetimi. (Ed. Celal GÜLŞEN). Ankara: Anı Yayıncılık.
- Baysal, N. (2009) İlköğretim II. Kademe Görevli Öğretmenlerin Sınıfta Karşılaştıkları Disiplin Sorunlarına, Bunların Nedenlerine ve Çözüm Yollarına İlişkin Görüşleri. Yüksek Lisans Tezi, Dicle Üniversitesi, Sosyal Bilimler Enstitüsü.
- Başar, H. (2008). Sınıf yönetimi. Ankara: Anı Yayıncılık.
- Bilir, A., Kuru, S., Tezcan, F. (2007). Sosyal Bilimler Enstitüsü Dergisi (İLKE). Muğla İli Ortaöğretim Okullarında Disiplin Uygulamalarına İlişkin Yönetici ve Öğretmen Görüşleri, 19, 22.
- Binbasioğlu, C. (1991). Genel Öğretim Bilgisi. Ankara: Kadioğlu Matbaası.
- Boyras, A. (2007) İlköğretim Okullarında Görev Yapan Aday Öğretmenlerin Sınıfta Karşılaştıkları Disiplin Sorunları. Yüksek Lisans Tezi, Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü.
- Budak, Z. F. (2009) İlköğretim Okullarında Görev Yapan İkinci Kademe Öğretmenlerinin Sınıf Disiplinini Sağlamak Amacıyla Başvurdıkları Ödül ve Ceza Yöntemleri Üzerine Bir Araştırma. Yüksek Lisans Tezi, Erciyes Üniversitesi, Sosyal Bilimler Enstitüsü.
- Celep, C. (2008). Sınıf yönetiminde kuram ve uygulama (4. Baskı). Ankara: Pegem Akademi Yayıncılık.
- Çerçi, H. Y. (2009). Devlet okullarında görevli öğretmenlerin disiplin yaklaşımları. Yüksek Lisans Tezi, Maltepe Üniversitesi, Sosyal Bilimleri Enstitüsü.
- Çiftçi, A. (2008) Sınıf Disiplininin Sağlanmasında Karşılaşılan Güçlükler ve Öğretmenlere Olan Etkisi Üzerine Bir Araştırma. Yüksek Lisans Tezi, Beykent Üniversitesi, Sosyal Bilimler Enstitüsü.
- Doğru, Ç. T. (2005) Okul- Öğretmen- Aile İşbirliğinin Sınıf Yönetimine Etkisi. Yüksek lisans Tezi, Zonguldak Karaelmas Üniversitesi, Sosyal Bilimler Enstitüsü.
- Eleser, G. (2007) İlköğretim Birinci Kademe Görev Yapan Sınıf Öğretmenlerinin Karşılaştıkları Disiplin Problemleri ve Bunlarla Baş Etme Yolları. Yüksek Lisans Tezi, Yeditepe Üniversitesi, Eğitim Bilimleri Enstitüsü.
- Esen, H. (2006) İlk ve Ortaöğretim Okullarında Görev Yapan Öğretmenlerin Kullandıkları Disiplin Türleri. Yüksek Lisans Tezi, Trakya Üniversitesi, Sosyal Bilimler Enstitüsü.
- Gülşen, C. (2014). “Sınıfta Motivasyon Sürecinin Yönetimi.” Kuram ve Uygulamada Sınıf Yönetimi (Ed. Celal GÜLŞEN). Ankara: Anı Yayıncılık.
- Gülşen, C ve Gökyer, N. (2015). Türk eğitim sistemi ve okul yönetimi. Ankara: Anı Yayıncılık.
- Günden, Suat. (1979). Genel Öğretim Bilgisi, Milli Eğitim Yayınları, Ankara.
- Güçlü, M. (2004) Ortaöğretim Kurumlarında Disiplin Cezası Alan Öğrencilerin Sosyo-Ekonomik Yönden İncelenmesi. Yüksek Lisans Tezi, Erciyes Üniversitesi, Eğitim Bilimleri Anabilim Dalı.
- Helvacı, M. A. (2014). “Sınıfta İletişim ve Disiplin Oluşturma” Kuram ve uygulamada sınıf yönetimi (Ed. Celal GÜLŞEN). Ankara: Anı Yayıncılık.
- Kayabaşı, Y & Cemaloğlu, N. (2007). Öğretmenlerin Sınıflarında Kullandıkları Disiplin Modellerinin Farklı Değişkenler Açısından İncelenmesi, Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (KEFAD). Cilt 8, Sayı:2, s.149-170.
- Kıran, H. vd. (2008). Etkili sınıf yönetimi (4. Baskı). Ankara: Anı Yayıncılık.

- Özdem, Erol. (2003). İlköğretim I.Kademesindeki Öğretmenlerin Sınıf Disiplinine İlişkin Görüşleri Ve Uygulamaları, Fırat Üniversitesi Yayınlanmamış Yüksek Lisans Tezi. Elazığ.
- Özcan, H. Ö. (2008) İlköğretim Okulu Yöneticilerinin Okuldaki Disiplin Yaklaşımları. Yüksek Lisans Tezi, Yeditepe Üniversitesi, Sosyal Bilimler Enstitüsü.
- Sarpkaya, R. (Ed.). (2011). Sınıf yönetimi. Ankara: İhtiyaç Yayıncılık.
- Satoğlu, E. (2008) Ortaöğretim Kurumlarında Öğretmenlerin Karşılaştıkları Disiplin Sorunları ve Baş Etme Yolları. Yüksek Lisans Tezi, Yeditepe Üniversitesi, Sosyal Bilimler Enstitüsü.
- Sirkeci, B. (2010) Özel ve Devlet İlköğretim Okulları Birinci Kademesindeki Öğretmenlerin, Sınıf Yönetimindeki Karşılaştıkları Disiplin Sorunları ve Yaklaşım Biçimleri. Yüksek Lisans Tezi, Fırat Üniversitesi, Sosyal Bilimler Enstitüsü.
- TDK (Türk Dil Kurumu). (2015). Genel Türkçe Sözlük. http://www.tdk.gov.tr/index.php?option=com_gts&arama=gts&guid=TDK.GTS.558e7c5f84ff98.52776853. (ET: 25.04.2015).
- Uçar, H. (2008) Mesleki Eğitim Kurumlarında Uygulamalı Ders Ortamlarının Disiplin Sorunlarına Etkisi. Yüksek Lisans Tezi, Yeditepe Üniversitesi, Sosyal Bilimler Enstitüsü.
- Yılmaz, N. (2007) Sınıf Öğretmenlerinin Sınıf İçi Disiplini Sağlamada Kullandıkları Ödül ve Ceza Yöntemlerinin Değerlendirilmesi. Yüksek Lisans Tezi, Yeditepe Üniversitesi, Sosyal Bilimler Enstitüsü.

Overcoming Hardships. Learning Acquisition Exemplified By Marie Curie's Life Experience

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"My head is so full of plans that it seems aflame. I don't know what is to become of me. You see, your Manya will be, to the end of her days, a flighty-head of flighty-heads" (Curie E. , 1947, p.80).

~Marie Curie

"I hope [...] you will have pleasure in living every day, without waiting for the days to be gone before finding charm in them, and without putting all hope of pleasure in the days to come. The older one gets the more one feels that the present must be enjoyed; it is a precious gift, comparable to a state of grace. [...]" (Langevin-Joliot, 1998).

~Marie Curie

ABSTRACT

Marie Curie is believed to be one of the greatest female scientists ever alive. For this reason the author has decided to look closely into her life. He does it in order to find a pattern of uniqueness. Mr. Krzyk analyses thoroughly so called *ideal* circumstances in which individual is able to obtain the best results in learning.

The paper tries to define conditions when person may accumulate knowledge in an efficient way. Also, the author wonders whether there are outer or inner factors that could be defined accounting for potential success? What is more, what was the role of historical background, family, determination or even stubbornness on this great scientist's learning process? How this experience can be redefined and used by educators today?

INTRODUCTION

Nowadays no one questions that Marie Curie was one of only few great female scientists. "Although not the first woman to excel in science or mathematics, Marie Skłodowska-Curie (1867-1934) was perhaps the first major woman scientist to receive full credit for her scientific work". (Pycior, 1993, p. 301). Probably there are only handful of people living today who have never heard about her. She is widely known as a discoverer of two elements Radium and Polonium and also the only woman ever received two Noble Prizes (after: Benjamin F. Shearer, 1997, p.63). Apart from that little is known among average people about her life, as she once described it "It is such an uneventful, simple little story. I was born in Warsaw of a family of teachers. I married Pierre Curie and had two children. I have done my work in France" (Curie, 1923, p.27). Such words might be justified by Marie Curie's great modesty. In contrary, her life seems to be rich with countless moments which can be quite inspirational. As once Albert Einstein said, "I have always admired ... Marie Curie. Not only did she do outstanding work in her lifetime and not only did she help humanity greatly by her work, but she invested all of her work with the highest moral quality. All of this she accomplished with great strength, objectivity and judgment. It is very rare to find all of these qualities in one individual. In fact, if more European intellectuals had had Madame Curie's modesty, conditions might have been much brighter" (Pycior S. W., 1999, p. 131).

Marie Curie's learning experience

In 1867 Marya Salomee Skłodowska – nicknamed Manya, who was to become the world most famous female scientist, later to be called Madame Curie or Marie Curie – was born in Warsaw (at 16 Freta Street) where she spent most of her youth. At that time probably there was no more difficult place to live than Kingdom of Poland, which at that time was a part of the Russian Empire. When the last Polish Uprising was crashed and that Czarist repression was gaining on strength – during the saddest time in the Polish history, in the contrary the people's hopes along with the patriotic feelings became even stronger than before as the only thing people wanted was a free and independent country¹⁸. Maria [...] entered a world in which almost every act, including the name of the

¹⁸ Czarist Russia was particularly brutal in its attempts to obliterate the Polish national spirit. An uprising in 1863 resulted not only in the public hanging in Warsaw of the revolt's leaders but also in a vigorous attempt to wipe out Polish culture. Russian officials were appointed to replace Polish ones. The educational

child, bore some relation to the Poles' struggle to survive the systematic and brutal suppression of their nation. Three years before, the Skłodowskis had witnessed the devastating defeat of the January Uprising, the second major attempt in the century to overthrow the rule of the Russian Tzars. In the end, tens of thousands of Poles, among them many of the most talented, were driven by the Tzar's armies in chain gangs to Siberia, most never to return. Władysław himself, though opposed to the tactic of violence, was to suffer along with his wife from the defeat of the insurrection. For the next fifty years, the Tzar's agents in Poland would preside over a *Russification* that was designed to weed out every trace of Polish consciousness – in education, in government, in intellectual and religious life" (Quinn, 1996, p. 17-18).

Manya grew up in a highly educated but impoverished noble family in which there were five children, four of them girls Zosia, Maria, Bronia, Helena and one son, Joseph. Once very rich, landed gentry „unable to provide for themselves on their small portions of land in Skłoty and in Łęczyckiem Skłodowski family spread around searching for place where they could make a living all around Republic of Poland (*Polish Commonwealths*). Possibly that some members of the family moved to Mazovia voivodeship and the place of their settlement called Skłody (which derives from Skłod(y)owski name)" (Lasocki, 1936, p. 50). Forced to scattered, once extended family, became a nuclear one where except parents within the household are only children. The role of grandparent had to be replaced by parents who tell the stories to the young ones. As a result education took over the land in importance. For this reason, it was not an ordinary family, as both her mother and father were intellectuals, her mom Bronisława ran a private school for girls and her dad Władysław was a school teacher of mathematics and physics. Mainly for this reason Manya was growing up in highly intellectual atmosphere, even things placed around the flat reminded her of science. "One, hung on the wall, was a precision barometer mounted in oak [...]. The other was a glass case with several shelves laden with surprising and graceful instruments, glass tubes, small scales, specimens of minerals and even a gold-leaf electroscope [...]. Manya could not imagine what these fascinating trinkets were. One day, straining on the tips of her toes, she was contemplating them with bliss when her father simply told her their name: "Phy-sics app-a-ra-tits." [...] She did not forget it she never forgot anything [...]" (Curie E. , 1947, p. 15). Both Manya's parents were aware of the importance of education as only this could ensure a job in the future, not to mention a teaching position for a young lady. We never knew how the teaching process in Skłodowski family would look like if Bronisława, the mother did not die. "This catastrophe was the first great sorrow of my life and threw me into a profound depression [...] Very much affected by the death of my mother, my father devoted himself entirely to his work and to the care of our education. His professional obligations were heavy and left him little leisure time. For many years we all felt weighing on us the loss of the one who had been the soul of the house" (Curie M. , 1923, p. 158). As her death left the entire family in despair and forced Władysław, Manya's father to take control over his beloved ones¹⁹. Later she recalled, "We all started our studies very young. I was only six years old, [...]. My father, an excellent educator, was interested in our work and knew how to direct it, but the conditions of our education were difficult. We began our studies in private schools and finished them in those of the government" (Curie M. , 1923, 158). For this reason the atmosphere in Skłodowski's family must have always been the one of intellectual discovery and challenge. As the daughter of Marie, Eva recalled in a biography devoted to her famous mother "It was true that Mr. Skłodowski knew everything, or nearly everything. The poor man, father of a family, balancing his budget with the greatest difficulty, had found leisure to develop his scientific knowledge by going through publications which he procured by considerable effort. It seemed to him quite natural to keep up with the progress of chemistry and physics, just as it was natural to know Greek and Latin and to speak English, French and German (as well as, of course, Polish and Russian); to translate the finest works of foreign authors into his native language in prose or verse..." (Curie E. , 1947, p. 46).

Despite her love towards Poland in order to obtain the proper education she had to attend the Russian gymnasium (high school), which entitle the students to enter universities. Even though women were not allowed to attend institutions of higher education and even later "[...] women scientists of Curie's period were especially vulnerable to stereotyping as subordinates in the scientific workplace" (Pycior, 1993, p. 303). Their education would have to be recognized formally so at there was no independent Poland, schools run by Poles were not granting official diplomas. Most of such schools were operating for the purpose of teaching Polish language and

system was placed under central Russian control. Attempts to teach Polish history, language, or literature became punishable offenses. Even very young Polish children knew that if an informer overheard them speaking Polish or uttering a patriotic sentiment they might be endangering themselves and their families. Not surprisingly, the Russian attempt to suppress Polish national feeling had the opposite effect; it heightened the devotion of Poles to their country and culture (Pasachoff, 1996, p. 11).

¹⁹ Marie's early years were less than carefree, not only because of the political situation in Poland, but also because of a personal loss. Her mother contracted tuberculosis when Marie was 5 and died at the age of 42, before Marie turned 11. During that period of more than five years, Marie's mother made a conscious effort, for fear of spreading the disease, to refrain from hugging and kissing the children whom she adored. Marie and her siblings did not fully understand their mother's behavior and felt alienated from her. Having experienced in swift succession the deaths of her oldest sister and her mother, Marie, who had faithfully attended Catholic services with her mother, no longer found credible the idea of a loving God (Pasachoff, 1996, p.12).

history. The Polish language was treated and taught as a foreign language and for this reason was not allowed to be openly spoken, there students were threatened by solitary confinement or school expulsion. “[...] Russian professors, who, being hostile to the Polish nation, treated their pupils as enemies. [...] So what the pupils were taught was of questionable value, and the moral atmosphere was altogether unbearable” (Curie M. , 1923, p. 159). Even after a long time when she has already finished the school Manya remembered it and wrote about it in her autobiography.

Still what needs to be said is the fact that Manya graduated from the Russian gymnasium receiving a gold medal when she was only 17 years old, one year ahead. It can be said that she obtained very good education, very complex and diversified at the same time. Not only was she literate as far as humanities was concerned but science as well²⁰. We might say that she was passionate about learning, it was her way to escape harsh reality of life. Even though from the perspective she wrote: “My solitary study was beset with difficulties. The scientific education I had received at the lyceum was very incomplete; it was well under the bachelorship program of a French lyceum; I tried to add to it in my own way, with the help of books picked up at random. This method could not be greatly productive, yet it was not without results. I acquired the habit of independent work, and learned a few things which were to be of use later on” (Curie M. , 1923, p.165-166).

So why did she studied so hard when at that time the Tsarist university did not accepted girls into universities. At that time, “[...] it was generally accepted that women could not and should not be scientists; they were held to lack the strength, rigor, and clarity of mind for an occupation that properly belonged to men” (Annette Lykknes, 2004, p. 577-578). As for most of the women at that time, Marie Curie’s education could have ended when she finished gymnasium. All in all, it cannot be said that Russian education was entirely wrong. The learning process was very demanding and the pupils had to study a great deal of material, mostly by heart. As she later recalled these period: “I devoted most evenings to my own education. I had heard that a certain number of women had managed to enter schools of higher education in St. Petersburg or abroad and I determined to prepare myself to follow them one day”. Still, Manya was not fond of Russian establishment as the officials were opposing the independent Poland. Probably for this reason and that her sister went to study medicine in Paris, she has decided to join her one day. But first, she had to earn enough amount of money to be able to provide for herself and pay the Sorbonne’s tuition fees.

Manya Skłodowska was so eager to gain scientific knowledge, that decided to study unofficially, despite fears, to attend *university on the run (floating university)*²¹. The classes were held secretly, each time in a different home. The students also brought education to the workers. The young people around Maria felt that what the people of Poland needed most was education. It was the era of Positivism in literature and the time when Polish youth rebelled against Romanticism. They were influenced by philosophers like Auguste Comte and Herbert Spencer. They believed that they were under the moral obligation to change the world and educate it by working with underprivileged people²². So Maria also taught children the language and polish history, which was forbidden at that time²³.

Marie's father could not help her as he lost most of family’s money, which he could not forgive himself for the rest of his life that he was unable to support financially his daughter's studies. So great had to be her hunger for

²⁰ “Since my childhood I have had a strong taste for poetry, and I willingly learned by heart long passages from our great poets, the favorite ones being Mickiewicz, Krasinski and Slowacki. This taste was even more developed when I became acquainted with foreign literatures; my early studies included the knowledge of French, German, and Russian, and I soon became familiar with the fine works written in these languages. Later I felt the need of knowing English and succeeded in acquiring the knowledge of that language and its literature. My musical studies have been very scarce. My mother was a musician and had a beautiful voice. She wanted us to have musical training. After her death, having no more encouragement from her, I soon abandoned this effort, which I often regretted afterwards. I learned easily mathematics and physics, as far as these sciences were taken in consideration in the school. I found in this ready help from my father, who loved science and had to teach it himself. He enjoyed any explanation he could give us about Nature and her ways. Unhappily, he had no laboratory and could not perform experiments” (Curie M. , 1923, p. 160-161).

²¹ Encouraged by a friend, Marie and Bronya attempted to circumvent the barriers the Russian system erected for Polish women by joining other young Poles in an illegal night school. The classes were held not in university buildings but rather in varying locations to avoid detection by the Russian authorities. As a result, the participants called the venture the [Floating University]. In the Floating University, Marie was introduced to progressive currents of thought as well as to the latest developments in physics, chemistry, and physiology (the study of how living things function). The mission of the patriotic participants in the Floating University was to bring about Poland's eventual freedom by enlarging and strengthening its educated classes (Pasachoff, 1996, p. 14).

²² “POSITIVISM, one of the main philosophical currents of the nineteenth and twentieth centuries, initiated by A. Comte. Derived partly from the philosophy of the Enlightenment, it dominated European intellectual history from the 1840s. [...] In Poland, positivism developed as a dominant intellectual and social current among the intelligentsia and liberal bourgeoisie in the 1864-1890 period. It was represented more in literary and sociopolitical movements than in scholarly-philosophical activities. It became a reaction against Romanticism* in literature and politics. As such, it assumed a critical, realistic, and practical attitude; emphasized the economic and educational foundations of political programs; and developed particularly after the fall of the 1863 January Insurrection,* when Polish political Romantic scenarios failed completely. The proponents of positivism were ready to accept a temporary loss of independence but advocated intense development of economic, educational, and cultural activities to overcome the backwardness of the Polish nation and to strengthen it by means of *organic work*” (Lerski, 1996, p. 467-468).

²³ “I have a bright remembrance of the sympathetic intellectual and social companionship which I enjoyed at that time. Truly the means of action were poor and the results obtained could not be considerable; yet I still believe that the ideas which inspired us then are the only way to real social progress. You cannot hope to build a better world without improving the individuals. To that end each of us must work for his own improvement, and at the same time share a general responsibility for all humanity, our particular duty being to aid those to whom we think we can be most useful. All the experiences of this period intensified my longing for further study” (Curie M. , 1923, p. 168).

knowledge and sacrifice when she decided to work far away from her family to fulfill her dream about studying. For this only reason, Maria agreed to the position of governess offered to her by the Żurawski family. Soon after she wrote to her brother Joseph from Szczuki: “While you are living at the centre of the movement, my existence strangely resembles that of one of those slugs which haunt the dirty water of our river” (Curie E. , 1947, p. 78).

During the holidays the Żurawski's eldest son Karol came home from the University where he was studying mathematics. A love-affair began between Maria and Karol. Maria had beautiful platinum blond hair, gray, sparkling eyes and what was the most important above all, she was intelligent. Karol was the first young, well educated man in whom she had become interested. But a marriage between the daughter of a gymnasium teacher and the son of a landowner was regarded in 19th century Poland, as in most of Europe, as a *mesalliance*. The parents of the boy did not give their consent. Maria had to leave the place as she was in despair²⁴. In the letter dated on March 12th, 1890 she wrote to her sister Bronya: “Dear Bronya, I have been stupid, I am stupid and I shall remain stupid all the days of my life, or rather, to translate into the current style: I have never been, am not and shall never be lucky. I dreamed of Paris as of redemption, but the hope of going there left me a long time ago. And now that the possibility is offered me, I do not know what to do, [...] I am afraid to speak of it to Father: I believe our plan of living together next year is close to his heart, and he clings to it; I want to give him a little happiness in his old age. On the other hand, my heart breaks when I think of ruining my abilities, which must have been worth, anyhow, something (Curie E. , 1947, p.82).

That marks the end of so called *heroic time* in her life when despite all odds she managed to obtain education, which still according to her, was insufficient. One might think that once Maria Curie set her foot on the French soil her entire life changed. In fact, it still was one of a struggle. She had to find her way in a completely new environment. “Unforeseen obstacles had suddenly raised themselves before her during the first weeks. She had thought that she knew French perfectly; she had been wrong. Some entire sentences, when said too rapidly, escaped her. She thought she had had sufficient scientific preparation to pursue the courses of the university. But her solitary work in the country, [...] the knowledge she had acquired by correspondence with M. Skłodowski, and the experiments attempted by hook or crook in the Museum of Industry and Agriculture, did not take the place of the solid baccalaureate training of the Paris schools. In mathematics and physics Marie discovered enormous holes in her *culture*” (Curie E. , 1947, p. 94).

Again, she proved to be very determined in her intellectual work. Only through a hard work and great determination did she manage to overcome the difficulties. Living alone, after she decided to move out from her sister's place as she wanted to live closer to Sorbonne. Everything to reduce the number of time she wasted on her way to and from the university. As she believed this time could be spent well on studying. For this reason, she changed the comfortable room to top-floor, tiny room, which became icy cold during winter months²⁵. Not only did the conditions of work might be shocking but also her daily studying regime, which she imposed on herself. “She had worked until three that morning and had slept four hours. Then she had gone to the Sorbonne. [...]. And the next day she began again to live on air. Work! . . . Work! Plunged altogether into study, intoxicated by her progress, Marie felt herself equal to learning everything mankind had ever discovered. She attended courses in mathematics, physics and chemistry. Manual technique and the minute precision of scientific experiment became familiar to her, little by little; soon she was to have the joy of being charged by Professor Lippmann with researches of great importance” (Curie E. , 1947, p. 107-108).

Soon after Marie Curie achieved unimaginable at that time for a woman world status, which after many decades is still remembered. It can be argued by many what were the reasons of her success. Her scientific career was no different from many before and after her, except some aspects that she was first. In other words there was no woman before her to become a professor at university, to win two Nobel Prizes in two different scientific disciplines. Also she discovered two elements Radium and Polonium, the first of them was believed to be a cure for all sorts of types of cancer, which led to her fame grew even stronger. “The American recognition of Marie Curie's achievements led to the world popularization of her scientific image. The press articles circulated throughout the 1921, made words: female and scientist interchanging synonyms commonly used later by others.

²⁴ “Everybody says that I have changed a great deal, physically and spiritually, during my stay at Szczuki. This is not surprising. I was barely eighteen when I came here, and what have I not been through! There have been moments which I shall certainly count among the most cruel of my life [...]” (Curie E. , 1947, p. 78).

²⁵ “The room I lived in was in a garret, very cold in winter, for it was insufficiently heated by a small stove which often lacked coal. During a particularly rigorous winter, it was not unusual for the water to freeze in the basin in the night; to be able to sleep I was obliged to pile all my clothes on the bedcovers. In the same room I prepared my meals with the aid of an alcohol lamp and a few kitchen utensils. These meals were often reduced to bread with a cup of chocolate, eggs or fruit. I had no help in housekeeping and I myself carried the little coal I used up the six flights. This life, painful from certain points of view, had, for all that, a real charm for me. It gave me a very precious sense of liberty and independence. Unknown in Paris, I was lost in the great city, but the feeling of living there alone, taking care of myself without any aid, did not at all depress me. If sometimes I felt lonesome, my usual state of mind was one of calm and great moral satisfaction. All my mind was centered on my studies, which, especially at the beginning, were difficult” (Curie M. , 1923, p. 170-171).

[...] The American Press lavished her with admiration, they even pronounced her the greatest scientists, female pioneer, the highest priestess of science” (Krzyk, 2013, p.239).

By no means, she popularized modern science among women in the XIX and XX centuries. “Curie attracted women from a number of countries [...]” (Annette Lykknes, 2004, p. 577). She even created many places of work in her laboratory in Paris. Obviously the most important criteria concerning the intellect had to be met but undoubtedly she helped female junior research workers with gaining some valuable experience in laboratory which for such a long time during her youth was refused to her²⁶. She also inspired the generations of women, who lived during her time²⁷ and those to come after her all around the world, due to historical affiliation mainly in countries she visited or had some connections with. Barbara Mikulski, US Senator of Polish descent said in her speech when she opens exhibition devoted to Marie Curie: “[...] at age eight, I saw this Greer Garson play, 'Madame Curie.' I wanted to be just like her. When I came home, I begged my mother and father to buy me a chemistry set. I wanted to go on, I wanted to be a scientist, I wanted to win a Nobel Prize” (Mikulski)²⁸.

Marie Curie seems to be a perfect example to teach young people about life and the important values in it. It can be redefined over and over and still one will find something valuable for himself. As once her daughter Eva Curie said: “THE LIFE OF MARIE CURIE contains prodigies in such number that one would like to tell her story like a legend. She was a woman; she belonged to an oppressed nation; she was poor; she was beautiful. A powerful vocation summoned her from her motherland, Poland, to study in Paris, where she lived through years of poverty and solitude. There she met a man whose genius was akin to hers. She married him; their happiness was unique. By the most desperate and arid effort they discovered a magic element, radium. This discovery not only gave birth to a new science and a new philosophy: it provided mankind with the means of treating a dreadful disease” (Curie E. , 1947, p. V). For many reasons given above Marie Curie is believed to be one of her kind. “Her brain was so precise, her intelligence so marvelously clear [...] She was supported by a will of iron, by a maniacal taste for perfection, and by an incredible stubbornness. Systematically, patiently, she attained each of the ends she had set for herself” (Curie E. , 1947, p. 110). One might get to excited reading it, what need to be understood that her life and attitude towards it should be set as an example. That everything is possible when you want it, that is probably why America fell in love with her. That despite all the obstacles she managed to accomplish her work. She even was able to raise two beautiful girls Irene and Eve, which for those who believed in a traditional role of women was somehow comforting for her opponents. We can go even further so say that the figure of Marie Curie allowed to change the image of women and their reception viewed by generations of men. Through her hard work she proved that a single woman is capable of great things, that she was equal to some greatest men alive. Her example inspired large number of women to be exactly like her, unstoppable and passionate²⁹. It changed men perseverance of women “[...] from a traditional Christian image to Darwinist more emancipated approach of female scientist” (Krzyk, 2013, p. 254).

Maria Curie's contribution to women existence in science is tremendous. The change in thinking can be easily compared to Copernicus's theory of heliocentrism where belief concerning the solar system was redefined. Both concepts at that time were considered to be immutable. The life of Marie Curie changed the way world viewed females scientific work and the dogma that the atom is the indivisible, smallest part of matter was redefined by Pierre and Marie Curie. Obviously, it would be unwise to even try to decide who was the greatest. Surely, we

²⁶ “The first woman to study there, the Canadian Harriet Brooks, came in 1906 and worked for a year under Marie Curie, who took charge of the laboratory after Pierre's tragic death and ensured that it retained its leading position within the field. During Gleditsch's first five years in Paris there were between two and five women and between eleven and twenty-two scientists in all in the laboratory. With her second Nobel Prize in 1911, this time in chemistry, Curie's fame increased; but during the same period the refusal of the French Academy of Science to elect her to membership and the rumors of her involvement with Paul Langevin may have affected her popularity. In any case, the number of workers at and publications from her laboratory decreased for a time. After the war, and with the inauguration of her new radium institute, the number of laboratory workers rose once again. Curie was aware of her *celebrity effect* and rejected students she suspected of wanting to work with her only to be able to brag about it later” (Annette Lykknes, 2004, p. 583).

²⁷ Marie-Isabelle Archinard, Anne Baschwitz, Lucie Blanquies, Mariette Blau, Harriet Brooks, Adrienne Brunschvicg, Catherine Chamie, Irene Curie, Sonja Dedichen, Alicja Dorabalska, Jeanne Ferrier, Renee Galabert, Janina Garczynska, Ellen Glenditsch, Iren Gotz, R. Gourvitch, Marthe Klein, Antonia Korvezee, Mademoiselle Larche, Marthe Leblanc, May Sybil Leslie, Wilhelmina Anna Lub, Marguerite R. Macaigne, Irene Manteuffel, Stefania Maracineanu, Branca Edmee Marques, Madeline Monin, Eliane Montel, Isabel Jocelyn, Marguerite Perey, Leonie Petri, Angele Pompei, Alice Prebil, Eva Julia Ramstedt, Erzsebet Rona, Alice Scouvert, Sonia Slobodkine, Jadwiga Szmidi, Suzanne Veil, Lucienne Weinbach, Marie Henriette Wibratte, Germaine Wiswald, Margaret von Wrangell, Helene Zavizziano (Piegeard-Micault, 2013).

²⁸ “When I was a little girl growing up in Baltimore, during World War II, my parents took me to see a famous movie about her. They wanted me to know the story of Poland; they wanted me to know the story of this brilliant, brilliant woman. And at age eight, I saw this Greer Garson play, 'Madame Curie.' I wanted to be just like her. When I came home, I begged my mother and father to buy me a chemistry set. I wanted to go on, I wanted to be a scientist, I wanted to win a Nobel Prize...I wasn't sure how to spell it, but I wanted to win it. The story mesmerized me and I worked in science. I had hoped as a young high school girl and as a young college student to have a career in science, but it was not meant to be. I am good at understanding science, but I'm not very good at doing science. So I shifted my career to social science, to social work, and to politics. But I now use my talents to fund those that do. When I think about what science has meant, when I think about Madame Curie...I think about all of the possibilities and potential for women, for those who have a passion for science, and for those who pursue the passion of intellectual discovery” (Mikulski, 2011).

²⁹ “According to the Rayner-Canhams, astronomy, crystallography, and atomic science (which included radioactivity) were the fields within the physical sciences that particularly appealed to women at the time. Brigitte Bischof has shown that radioactivity was presented as a *romantic endeavor* in the Viennese media and that women, in particular, were attracted to the field and to Marie Curie as a person, although she never specifically promoted women researchers” (Annette Lykknes, 2004, p. 583).

can say that both Copernicus and Curie change the sphere of their worlds. For which they paid the price of persecution throughout their lives.

So, would Marie Curie ever become the leading female scientist of her time without being raised in Poland under the Russian domination – probably not. “Undoubtedly by analyzing the time of Marie’s childhood we may spot the great influence of this time on her personality, beliefs, and her ambitions. [...] This time combined with strong father’s influence built her strength, stubbornness and perseverance in her own work” (Krzyk, 2014, p.252). Early on did Marie Curie have to grow up, as during her childhood little was time to play. From the early moment she was about to experience troubles of life (sadness and sorrow). Early enough did she learn to hide herself behind books, in a completely new world, which Barbra Goldsmith identified as *the inner world*. “The only way to survive for her was to reject the world and to concentrate like a crazy on one particular thing and to keep away the feeling of emptiness” (Goldsmith, 2005, p. 21). It cannot be stated that during her early childhood her learning potential was wasted. In other circumstances she could have become one of the girls she described when visiting her family: “the young people of this area are not really at all interesting: the girls are geese who don’t open their mouths except to be as provocative as possible. They all dance perfectly. They’re actually not bad, some of them are even intelligent, but their education has not developed their minds, and the festivals around here, which are insane and incessant, have ended up making them scatter-brained. As for the young men, almost none of them are very nice or in the least intelligent [...]”. The world would never find out about Great Curie if teachers (even the cruelest) did not demand from her and she would not do the same towards herself.

CLOSING REMARKS

There are no doubts that learning for Marie Curie was very important as it is nowadays for young people, some of them have not just realized it yet. It is well-known that learning itself is a very complex process. Despite the fact that most of the people in the world undergo some kind of formal or informal process of education not everyone graduates from universities and contributes to science. Why despite very good prospectus vast majority of them do not achieve success. Why pupils living in developed countries are reluctant to higher education whereas those living in underdeveloped places of our world perceived education as the only way to gain success in life. It is in fact a great contradiction, similar to the Marie Curie paradox that the more difficult conditions she experienced, the greater her achievements were. So, should we in fact, at certain level make it more difficult for the student to achieve positive results. It should be natural that the longer pupils learn the greater results are to be expected from them. Obviously, one might say that not everyone can be a genius, that everything depends on personal qualities which create an individual. But isn’t it true that every child despite its gender is eager and curious towards new things, only later on some of them loose interest in studying.

So how today the Marie Curie’s life experience can redefine the teaching process and change it for a educators favor during the time when less and less material is covered during the teaching process even though from the historical point of view there are more date to be taught. As a result, great part of the materials are omitted. Again, with such extended teaching methodology even greater amounts of knowledge should be assimilated by students. What is more, the usage of so called new media (interactive boards, computers, with all the software) teaching and for this reason learning such be simple, problem free, and at the same time effective.

The core curriculum should be carefully designed as to use such examples like Marie Curie’s life experience to educate students about motivation, which students in great numbers do not possess. Thanks to her diversified life various interesting topics might be designed to send her message across to the new generation of people. “The classes devoted to Marie Curie can be initiated during the Polish language lessons, physics, chemistry, and history” (Pławecka, 2013, p.120). Once again, we should allow Marie Curie to inspire us, as she was doing it throughout XIX and XX centuries.

During the period between 1945-1986 eighteen different short reading texts were devoted to different aspects of Marie Curie’s life. Among them entitled: *Marie Skłodowska-Curie*, *Marie Curie and her visit to the United States of America*, *Among glowing midsummer worms*, *Marie Curie’s disinterest*, *Polonium*, *In a wooden shed*, *Little Manya*, *Marie Curie’s charm* (Sienko, 2013, p. 66-68). Mentioned here fragments were parts of Polish text books used to teach the language to students in primary and secondary schools. If it comes to the present time, as far as the publications published under the new curriculum³⁰ there is shortage in publications devoted to

³⁰ Under the new core curriculum of 1999 the new type of school was introduced to Polish Education System – three-year lower secondary school *gimnazjum*. From now on the eight-year primary school was changed into a six-year bearing the same name (2nd level) to be followed by the new type of school lower secondary school (3rd level). The 4th level of education offers three types of schools, which can be chosen upon exam results obtained on previous level of education. There are: three-year general upper-secondary schools, four-year technical upper-secondary schools and basic vocational schools. The new Core Curriculum was introduced as from 2009 in grade 1, and will be completed in 2015 in general upper-secondary and basic vocational schools, and in 2016 in technical upper-secondary schools. Upon the new system students are obliged to undergo external standardized examination after each level, such exams tests examination tests abilities, skills and knowledge in the fields of humanities and science, as well as foreign language competence. Upon the completion of the three-year general upper-secondary school pupils are awarded a school leaving certificate on the basis of school grades. It gives them the access to the matriculation examination or to post-secondary education. The pass margin is 30% to obtain the A-level pass rate. What is new within the system is the fact that

her, as if for new generations of students her example would not be good enough, as if her story could not teach them anything valuable. It needs to be stressed that the Polish Education System undergoes current changes, for this reason number of books are published and republished annually. This is a great opportunity to introduce such people back to the curriculum so her life can be remembered for another hundred years to come by showing her significant scientific achievements and analyzing attributes of her personality, which made it possible to succeed in science, but also look closely to hardship originated in historical affiliation of the time when she lived, last but not least the women struggle to self-governing might also be used when dealing with topics devoted to gender studies.

References

- Annette Lyknes, L. K. (2004). *Appreciated Abroad, Depreciated at Home. The Career of a Radiochemist in Norway: Ellen Gleditsch (1879–1968)*. Chicago: The University of Chicago Press.
- Benjamin F. Shearer, B. S. (1997). *Notable Women in the Physical Sciences: A Biographical Dictionary*. Greenwood Press.
- Curie, E. (1947). *Madame Curie*. London - Toronto: William Heinemann Ltd.
- Curie, M. (1923). *Pierre Curie and Autobiographical Notes*. New York: Macmillan Company.
- Goldsmith, B. (2005). *Obsessive genius. The inner world of Marie Curie*. New York + London: W. W. Norton & Company.
- Krzyk, A. (2013). The model of woman-scientist. About Maria Skłodowska-Curie's visit to the United States. In M. S.-B. Zofia Budrewicz, *Kiedy przekraczanie granic pozwala myśleć inaczej. Maria Skłodowska-Curie* (pp. 239-255). Kraków: Wydawnictwo Naukowe Uniwersytetu Pedagogicznego.
- Krzyk, A. (2014). Maria Skłodowska-Curie - ujęcie antropologii portretu kobiety naukowca w kontekście problematyki gender. *Portrety Kobiecości [The portraits of femininity]* (pp. 250-261). Kraków: Fall.
- Langevin-Joliot, H. (1998). Madame Curie's Discovery of Radium. *Radiation Research, Vol. 150, No. 5*, S3-S8.
- Lasocki, Z. (1936, April). Marie Curie's descent [polish: Pochodzenie Marji Skłodowskiej-Curie]. *Miesięcznik Heraldyczny No. 4*.
- Lerski, G. J. (1996). *Historical Dictionary of Poland, 966-1945*. Greenwood Press.
- Mikulski, B. (brak daty).
- Pasachoff, N. (1996). *Marie Curie and the Science of Radioactivity*. New York • Oxford: Oxford University Press.
- Piegeard-Micault, N. (2013). *Les Femmes du laboratoire de Marie Curie*. Paris: Editions Glyphe.
- Plawecka, K. (2013). Wizerunek kobiety uczoney. Maria Skłodowska-Curie we współczesnej edukacji polonistycznej. In M. S.-B. Zofia Budrewicz, *Kiedy przekraczanie granic pozwala myśleć inaczej. Maria Skłodowska-Curie* (pp. 110-125). Kraków: Wydawnictwo Uniwersytetu Pedagogicznego.
- Pycior, H. M. (1993, May). Reaping the Benefits of Collaboration While Avoiding Its Pitfalls: Marie Curie's Rise to. *Social Studies of Science, Vol. 23, No. 2*, strony 301-323.
- Pycior, S. W. (1999). MARIE SKŁODOWSKA CURIE AND ALBERT EINSTEIN: A PROFESSIONAL AND PERSONAL RELATIONSHIP. *The Polish Review Vol. 44, No. 2*, strony 131-142.
- Quinn, S. (1996). *Marie Curie: A life*. Cambridge, Massachusetts: Radcliffe Biography Series.
- Sienko, M. (2013). "Lewy profil uczoney". Maria Skłodowska-Curie w służbie polonistyki socjalistycznej. In M. S.-B. Zofia Budrewicz, *Kiedy przekraczanie granic pozwala myśleć inaczej. Maria Skłodowska-Curie* (pp. 64-91). Kraków: Wydawnictwo Uniwersytetu Pedagogicznego.
- Wood, F. C. (1938, April). Marie Curie--Her Life Work. *The Scientific Monthly, Vol. 46, No. 4*, strony 378-385.

students are taught some of the subjects at the extended level of total number of 870 teaching hours (1 hour = 45 minutes). The school and not the student decide upon the list of extended subjects, as the result some of the student might never be able to learn chemistry nor physics. Starting in 2015 the matriculation examination for graduates of general upper-secondary schools (and in 2016 for graduates of technical upper-secondary schools) is based on different rules, i.e. it is adjusted to requirements included in the new Core Curriculum. Changes introduced to this examination force the students to chose one extended subject to be examined during the matriculation examination, which does not need to be passed to obtained the certificate of completion. (retrieved from: <http://www.frse.org.pl/sites/frse.org.pl/files/publication/1273/system-education-poland.pdf>)

Photographs As Mediating Tools Between Science Knowledge And The Real World: The Case Of ‘Resources Sustainable Management’ In Portuguese School Textbooks

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ABSTRACT

Due to the educational importance of visual devices, textbooks should have good equilibrium between text and image. Photographs are one of those devices. When included in school textbooks they may act as mediators between science knowledge and the real world. This research focused on investigating to what extent those photographs may promote the integration between science knowledge and the real world. Photographs included in the theme “Resources Sustainable Management” as it is approached in three selected 8th grade Natural Sciences Portuguese textbooks were content analysed. The analysis was supported by a checklist including the following dimensions: number of photographs; types of photographs; location of the photographs; role of the photographs; caption of the photographs; contextualization of the entities photographed; nature of the entities photographed; relationship of the photographs integrated along the text with the text itself. Findings reveal that the textbooks analysed include a high mean of photographs per page. Besides, they show photographs that, in most cases: are integrated along the text; aim at illustrating contents being presented; focus on entities and situations familiar to students. In some cases, a considerable amount of photographs: do not have a caption; are not mentioned in the text; are not related to the content presented. This way of using photographs may impair their role of mediators between science knowledge and students’ everyday world and may have a reduced or even null added educational value: These results have implications for textbook illustrators and authors, as well as for teachers.

INTRODUCTION

The main goal of science teaching in schools is to develop children’s scientific literacy so that they can appreciate the scientific endeavour, understand the natural world and use science in their future personal and professional lives (Martins, 2011; Johntson, 2011). This is especially important at the compulsory education level that is targeted to all children. To attain that goal, science taught in schools should be based on real socio-scientific contexts (Gilbert, 2006; Lavonen et al., 2010; King, 2012). However, science teaching in schools has hardly adopted this approach and, more often than it should, it stays apart from people’s everyday life and word. A consequence of this is may be students’ lack of interest in science which may not only have a negative effect on their performance level in compulsory education but also lead them to avoid taking science at upper secondary school and university.

Besides, research has shown that when children enter school they already hold some conceptions that are inconsistent with the scientific point of view and that are hard to overcome (Devetak & Vogrinc, 2013). According to Pozo and Gomes (1998), those alternative conceptions may have three main different prevailing origins: sensorial, analogical and social. In fact, social encounters (e.g.: with science non-specialists as well with mass media information, magazines, popular books, movies, etc.) convey information and ways of explaining natural phenomena that may reinforce students’ alternative conceptions or even induce new ones. Being a human enterprise, and therefore a naturally non-perfect work (Leite, 2002), textbooks are one of the tools that may also convey alternative conceptions to students too, namely through the visual information they include (see, for example, Leite, 1999; Leite & Afonso 2001), the way they use it and the things they omit about it.

As Ahtineva (2005) argues, school textbooks should promote a bridge between the real world and the scientific theories that explain them. They should also include information in such a way that students, with different previous experiences and knowledge, can understand how science and the real world are interconnected, and they should do it without taking the risk of reinforcing and inducing alternative conceptions. Besides, as Devetak and Vogrinc (2013) point out, a good textbook should have a good equilibrium between verbal information (given through a text) and visual or pictorial information (e.g., graphs, tables, drawings, photographs, etc.).

There are many words associated with visual or pictorial devices or images. López-Manjón and Postigo (2014) consider the existence of several types of images, some more realistic than others: illustrations that include photographs, technical images and drawings; visual diagrams that deal with structures and processes; verbal

diagrams that include conceptual maps, tables, and charts; and graphs. This paper focuses on photographs, presented either alone or together with other types of representations. However, it draws also on literature focusing on other types of visual devices as all of them share the need for perception to be used when making sense of them.

Pictorial information may be a relevant facilitator of school learning (Cook, 2008) because science deals with abstract concepts that may not have visual exemplars (Devetak & Vogrinc 2013) or whose exemplars do not belong to students environment. However, pictorial information may face students with several obstacles that need to be taken into account and avoided, as they may lead to unintended misunderstanding of the images (Colin, Chauvet & Viennot, 2002) and prevent learning from taking place. In addition, it is worth noting that Colin, Chauvet and Viennot (2002) found that difficulties with images are similar for students with and without previous education on the theme. Therefore, it cannot be assumed that images “yield their meaning directly and simply” (Stylianidou, Ormerod & Ogborn, 2002, p. 20). As perception is a cognitive tool that needs to be used when learning from visual devices, the result of students interaction with an image will depend at least in part on the learners’ characteristics (including their cognitive structure, work memory, learning and cognitive styles, etc.) as well as on the characteristics and context of the image they try to interpret to make sense of. Therefore, as Cook (2006) argues, “Without proper design and consideration for individual differences among learners, visual representations may be no better than textual information alone or, at worst, may actually interfere with learning or lead to misconceptions about scientific phenomena.” (p.1087). Hence, images selection should be consistent with cognitive learning principles. This means that they should be integrated with text in such away as to “improving contiguity and coherence of the text and illustrations, as well as eliminating irrelevant materials” (Cheng, Chou, Wang, & Lin 2015, p.485), in order to help the reader to minimize the extraneous and unnecessary memory work load.

Textbooks make use of many types of visual displays to help students to learn difficult science concepts (Cook, 2008). Over the last decades there has been even a tendency to increase the amount of pictorial and colourful information in textbooks. In some cases, this increase was so large that it led textbooks to use ten times more images than press articles on science and technology do (Dimopoulos, Koulaidis & Sklaveniti, 2003). Photographs are the most frequent pictorial devices included in textbooks and can play several different and important roles in them (Pozzer & Roth 2003). If well-chosen and properly used they can act as mediators between science knowledge and the real world (Dourado, Morgado & Leite, in press). Unfortunately, most textbooks include photographs with decorative (Perales, 2008) and selling purposes (Cook, 2008) and they would then be dispensable from a pedagogic point of view (Perales, 2008). Besides, it is worth noting that photographs obtain their powerful role as representations of the real world through the reader’s work. On one hand, the texts that are co-present with the photograph should provide useful guidance for reading the photographic image, reducing the number and diversity of possible interpretations; on the other hand, students should both receive instruction in critical analysis of photographs and be involved in such practices but, unfortunately, this hardly happens (Roth, Pozzer-Ardenghi & Hans, 2005).

Despite the acknowledged potential value of photographs as teaching and learning devices, several limitations have been identified in photographs used in textbooks. A meaningful amount of photographs included in Portuguese physical sciences textbooks show decontextualized entities as well as settings that are too familiar to students (Dourado, Leite & Morgado, in press) and have no added value in terms of promoting students’ learning. López-Manjón and Postigo (2014) found out that even though there are some cases of suitable uses of colour and graphic elements in school Spanish Natural Sciences textbooks, visual resources are not good enough: the title is included in only 60% of the images, some titles do not help reading the image properly and have no reference to the representative nature of the image; only 46% of the images include labels of different parts and the text does not make any reference to the image (76%). These results reinforce Lee’s (2010) concern about the quality and utility of representations in modern schools textbooks. In fact, as reading science textbook pictures is not at a trivial task for pupils, “teachers need to spend time and effort talking through the meaning of the images with them.” (Stylianidou, Ormerod & Ogborn, 2002, p.20).

Acknowledging the idea that for visual representations to have educational value they need to be properly selected, structured and integrated with other elements (namely the text), it has been argued that it is worth being aware of the powers and weaknesses of the images included in textbooks or other educational materials and have a sort of checklist that helps teachers and textbook illustrators to think about images. Thus, several authors have developed tools to analyse visual material, namely photographs, included in textbooks. Some of these tools are more comprehensive than others, they include different dimensions of analysis and the categories defined for a given dimension may differ from author to author too. This diversity of criteria of analysis makes it difficult to compare results of the different studies and suggests the need for a comprehensive device that enables a more systematic analysis of this type of material. Table 1 synthesises some of those tools, mentioning the dimensions focused on in each study.

Even though in different ways, all the authors focused on the function (or role) of the photographs or visual representations, as well as on the type of photograph. These are important dimensions as they have to do with the

purpose of the photo and the cognitive requirements it offers to the students. Other aspects pedagogically relevant aspects that were mentioned in at least one of the papers is referencing the image in the text, and characteristics of the visual component of the image. The former has to do with the interrelationship of photograph and the co-present text and it inform about the way textbooks authors would like the photo to be used and limits its possible interpretations. Also, the integration of photographs in a task is a relevant issue as it informs about the existence or not of appropriate guidance for exploring the photograph. Number of photos and size of the photograph are technical elements that may inform about the required equilibrium between diverse ways of conveying information to students.

Table 1: Synthesis of some criteria developed to analyse visual material included in textbooks

Authors	Dimensions of analysis
Dimopaulos, Koulaidise & Sklaveniti (2003)	<ul style="list-style-type: none"> - Type of image - Function of the image - Framing of the image (social-pedagogic relationships) - Formality of the image (elaboration and abstraction of the corresponding visual code)
Roth, Pozzer-Ardengai & Hans (2005)	<ul style="list-style-type: none"> - Function of photographs - Structures of co-deploying photographs and text (indexical reference, single and multiple photographs and background of photographs)
Perales (2008)	<ul style="list-style-type: none"> - Intentionality of the image - Complexity of the image - Orientation on the information conveyed - Combination of symbolic elements - Analogical function of the images - Context conveyed by the image - Tasks associated with the image - Scientific and technological accuracy of the image
Lee (2010)	<ul style="list-style-type: none"> - Numbers of visual representations - Type of visual representations - Purposes of visual representations
Anagnostopoulou, Hatzinikita & Christidou (2012)	<ul style="list-style-type: none"> - Dimensions of the visual material: - The frequency of its inclusion - Type of visual material (e.g. photographs, diagrams, tables); - Role of visual information - Association of visual information with tasks
López-Manjón & Postigo (2014)	<ul style="list-style-type: none"> - Number and size of the images - Type of image: - Characteristics of the visual component of the image - Existence of visual and verbal resources for image interpretation - - Referencing the image in the text.

Dimopaulos, Koulaidise and Sklaveniti (2003) also analysed the formality of the visual code corresponds which inform about the degree of its abstraction. According to these authors, “The more an image represents the deeper essence of what it depicts by downgrading the superficial variability of its external features the higher is its formality. Low formality then corresponds to representations very close to photographic realism” (Dimopaulos, Koulaidis & Sklaveniti, 2003, p.200). Visual representations may seem to be most helpful for students to learn about labelling structures and describing the phases of a process, than to learn about the overall process as a whole (Cook 2008). Hence, textbooks visual representations, including photographs, should be associated with a text that explains the phenomenon (Cook 2008). Thus, photographs and text should form the written correlate of a demonstration. Dimopaulos, Koulaidis and Sklaveniti (2003) state that most students ignore anything other than the main text, and in order to avoid this risk, important concepts and information should be placed in the main text, with the appropriate reference to the photograph inscription.

As far as function are concerned, they have an hierarchy of increasing informational value (explaining a concept does more than simply illustrating a concept) and those with higher information value (usually also do what the photographs of lesser informational value do). The authors argue that the caption should be enough to understand the picture as it intended to be interpreted. However, to find out that the differences in the information provided by the caption not just influence readers’ interpretations of the photograph and therefore what they can learn

from them but also change the role of the inscriptions in the text (Roth, Pozzer-Ardenghi & Hans, 2005). The differences in the information provided by the caption not just influence readers' interpretations of the photograph and therefore what they can learn from them but also change the role of the inscriptions in the text. Based on a large sample of Spanish secondary schools physics textbooks, Perales (2008) concluded that the majority of the visual illustrations included in the textbooks analysed are inadequate from a pedagogic point of view. The results reported above raise the question about the pedagogic quality of the photographs used in nowadays Portuguese science textbooks.

OBJECTIVES

This research focuses on investigating to what extent photographs included in school science textbooks may promote the integration between science knowledge and the real world. It concentrates on natural sciences, low secondary school textbooks, more precisely on the teaching unit 'Resources Sustainable Management'. As (Sullivan, 2008) puts it, "Given the special importance of photographs among graphical representations in high school textbooks, and considering the unique weight that they carry in student learning and perceptions of reality, it is reasonable to conclude that an examination of photographs constitutes a study of a significant force in student learning." (p. 1008).

THE STUDY

This study focused on three 8th grade Natural Sciences textbooks that deal with the theme 'Resources Sustainable Management'. The textbooks were used in Portuguese schools during the 2014/15 academic year. They were written by different author teams and were edited by different textbooks publishers. These publishers are well-known in the country and they have been publishing textbooks for many years. The reason why not only different author teams but also different publishers were selected has to do with the fact that the latter usually take images from their pools to be included in the books they publish. This way of selecting the textbooks would avoid having two (or even three) different textbooks written by different author teams using some common images. This would reduce the interest of the research as besides obtaining knowledge on the way textbooks use photographs, we would like to get information on how to do analyses of how photographs are dealt with in textbooks.

The theme 'Resources Sustainable Management' was chosen because it is a theme in which photographs may be used to show the natural world and to foster the relationship of science and people's everyday life. In fact, it has to do with issues like the following: Types of natural resources; Exploration and processing of natural resources; Land planning and management; Waste and water Management for sustainable development; Scientific and Technological development for improving the quality of life of human populations.

Photographs (pictures), photographs combined with other graphical elements (e.g. a pie chart or labels or a scheme) and drawings-like photographs included in the textbook pages devoted to the selected science theme were identified to be content analysed. These three types of photographs are shown in figure 1.

Those photographs may be given at the first page of the theme or of its subthemes, integrated into the text, integrated into activities for students, given in marginal curiosity boxes or used as a background to beautify the textbook page.


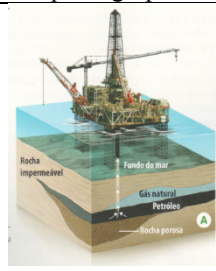
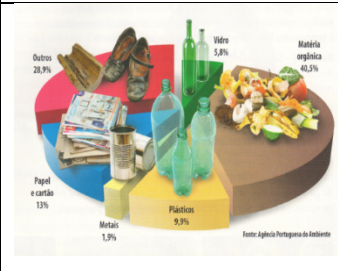
Photographs	Drawings like photographs	Photographs combined with other elements
		
ST1 p.195	ST2 p.186	ST1 p.218

Figure 1: Examples of the three types of photographs analysed

A checklist was developed for this purpose. It included the following dimensions of analysis: number of photographs; types of photographs; location of the photographs; role of the photographs; caption of the photographs; contextualization of the entities photographed; nature of the entities photographed; relationship of the photographs integrated along the text with the text itself. For each dimension, an *a posteriori* set of categories of analysis was developed. This task was supported by the literature that reports similar analyses,

namely by Pozzer and Roth (2003), Roth, Pozzer-Ardenghi and Hans (2005), Devetak and Vogrinc (2013), and López-Manjón and Postigo (2014).

Afterwards, the photographs were classified by one of the authors into those dimensions and categories and the classification was checked by the others. Fully agreement was reached between the three authors. In the next section, data will be presented by School Textbook (ST). The classification done will be illustrated by selected examples of photographs included in the manuals.

FINDINGS

All textbooks use large numbers of photographs when dealing with the theme ‘Resources Sustainable Management’ (table 2). These results are consistent with those obtained by authors like Pozzer and Roth (2003), with Brazilian biology textbooks, Dimopaulos, Koulaidise and Sklaveniti (2003), with Greek science textbooks, Lee (2010) with US physical science textbooks, and Kim, Kong and Lim (2011) with Korean science textbooks that also found a large number of photographs to exist different sciences textbooks. Besides, the mean number of photographs per page (equal to or over 3,4) is quite similar in the diverse textbooks (table 2). However, it is worth noting that López-Manjón and Postigo (2014), obtained a much smaller number (1,4) of photos per page of biology school textbooks, meaning that they do not rely as much as the Portuguese ones in photos.

Table 2: Number of photographs used by the textbooks when dealing with the theme, per textbook and page (f)

School Textbook	Number of Photographs	Number of Pages	Photos/Page
1	275	80	3,4
2	225	62	3,6
3	296	80	3,7

All textbooks include the three types of photographs considered in this analysis (table 3). However, the three textbooks are quite different with regard to the types of photos they include. In fact, while most of the photos used by textbook 1 (92,4%) and about half of the pictures in textbook 3 (55,4%) are real photographs, only one third of the photos used by textbook 2 (33,8%) belong to this category. In addition, the other photos used by textbooks 2 and 3 are divided by the two remaining categories, that is drawing-like photographs and photographs combined with other graphic and/or verbal elements. It should be noted that some authors (López-Manjón & Postigo, 2014) have also found photographs combined with other verbal and pictorial elements but in a lower percentage than the one obtained in the present study.

Table 3: Types of photographs used by the textbooks when dealing with the theme (%)

Type of photographs	ST 1 (n ₁ =275)	ST 2 (n ₂ =225)	ST 3 (n ₃ =296)
Photographs	92,4	33,8	55,4
Drawing-like photographs	0,4	35,6	22,0
Photographs combined with other graphic and/or verbal elements	7,3	30,7	22,6

Whatever the textbook, most of the photographs (between 71,6% (ST 3) and 89,8% (ST 2)) are integrated into the text that introduces the new content and a few other photographs (between 9,5% (ST 1) and 20,3% (ST 3)) are integrated into activities that are supposed to be performed by the students (table 4).

Table 4: Location of the photographs used by the textbooks when dealing with the theme (%)

Location of the photographs	ST 1 (n ₁ =275)	ST 2 (n ₂ =225)	ST 3 (n ₃ =296)
Presented at the beginning of the chapter	0,0	0,4	0,3
Presented at the beginning of the sub-chapter	0,0	0,0	6,1
Integrated into the text that introduces the content	84,4	89,8	71,6
Integrated into the activities	9,5	9,8	20,3
Apart from the text, into Curiosity boxes	6,2	0,0	1,7

Textbooks differ with regard to the use of photographs at the beginning of the chapter (that is the theme under analysis) or sub-chapters (sub-themes that compose the theme under analysis). As shown in table 5, textbook 1 does not use them and textbook 3 uses them both at the beginning of the chapter and at the beginning of the

subchapter. Textbooks 1 and 3 (this one in a lower percentage) use photographs to illustrate curiosities (that are related to non-mandatory issues) that are given aside the main text. As far as it is known, no previous research concentrated on all the dimensions dealt with in the present study. In addition, usually authors do not specify what pictures they are analysing. It may happen that those authors that omit the information on what activities they are analysing do it because they are focusing on all of them. A consequence of this would be that those textbooks do not include a variety of photographs as large as the one found in the textbooks analysed. However, another research carried out by the authors (Dourado, Morgado & Leite, in press), concentrating on physical sciences textbooks, showed a variety of uses of photographs similar to the one obtained in the research reported in this paper.

The majority of the photographs integrated into the text aim at illustrating the content being presented (table 5) and therefore they work as a compliment to the text. Some others are integrated in activities for students and they aim at fostering knowledge use. Textbook 3 includes the largest percentage of photographs associated with activities that have knowledge use purposes.

Table 5: Role of the photographs used by the textbooks when dealing with the theme (%)

Role of the photographs	ST 1 (n ₁ =275)	ST 2 (n ₂ =225)	ST 3 (n ₃ =296)
Motivation to learn	0,0	0,4	6,4
Content illustration	84,4	89,8	71,6
Content related curiosity	6,2	0,0	1,7
Knowledge use	9,5	9,8	20,3

Textbooks 2 and 3 include photographs at the beginning of the chapter or subchapter (opening page) whose aim is to motivate students to learn about the theme of the chapter or the subchapter. In some cases they include questions that hopefully should be answered during or after the theme or subtheme development. Textbooks 1 and 3 include a few photographs that call attention to content related curiosities. They are included into boxes, presented aside the text, and mention aspects that are related to the text but not relevant to its understanding. The three textbooks include a few photographs in the tasks targeted to foster students' knowledge use. In most cases, students need to analyse and understand the photograph to successfully do the task. These roles were also identified by Dourado, Morgado and Leite (in press), but the opposite is not true. In fact, Dourado, Morgado and Leite (in press) also found photographs integrated into analogies, in order to make the analogy explicit.

The three textbooks are quite different with regard to the inclusion of a caption into the photographs. Even though textbooks 2 and 3 include some photographs without a caption, most of the photographs included in textbook 1 (58,9%) do not include any caption (table 6). Some of these photographs are the ones used to motivate students, either at the first page of the chapter or as a background to beautify the textbook page. However, a few others seem to be intended to be informative and therefore they should bear a caption but they do not have it. This may impair the reader interpretation of the photograph, at least in the intended way. As Roth, Pozzer-Ardengai and Hans (2005) argue, "The differences in the information provided by the caption not just influence readers' interpretations of the photograph and therefore what they can learn from them but also change the role of the inscriptions in the text." (p.107).

Table 6: Caption of the photographs used by the textbooks when dealing with the theme (%)

Caption of the photographs		ST 1 (n ₁ =275)	ST 2 (n ₂ =225)	ST 3 (n ₃ =296)
Caption	Appropriately matches the content of the photo	6,2	17,3	2,7
	Makes some explanatory comments on what is shown in the photo	18,5	12,0	37,2
	Does not match the content of the photo	10,2	49,8	27,7
Replaced by an explanation focusing on page content and ignoring the photo content		9,8	8,4	0,0
No caption		58,9	12,4	32,4

Textbook 2 is the one that presents the largest (17,3%) percentage of pictures with a caption that appropriately matches the photograph content. However, it is also the one that presents the largest percentage (49,8%) of the photos with a caption that does not match the content of the photograph. This can be illustrated by the fact, in page 176, it presents a picture showing a landscape, a lake, birds, a factory and wind turbines and the captions

says: “classification of natural resources”. In fact, natural resources (like water in a lake) are shown but not classified and they are mixed with technological centres (e.g., the factory). Also, in page 217, it presents a picture showing wood pieces, and the caption says: “there are several types of waste being some of them very dangerous”. In fact it shows only a type of waste which is not dangerous.

Besides, on one hand, in a few photographs, given in the textbooks 1 and 2, the caption is replaced by an explanation of the content that is being dealt with in the textbook page, without focusing on the picture content. For instance, textbook 1 presents a picture from vehicles just bearing the H symbol, and its caption says that: “There are some vehicles that use hydrogen as their fuel. Fuel cells are electrochemical systems that convert hydrogen and oxygen chemical reaction energy into electric energy” (p.198). On the other hand, the three textbooks include photographs whose caption is not just a caption (mentioning what is shown in the picture) but it also adds some explanatory comments on what is shown in the photograph. For example, textbook 2 presents a picture from animals (an elephant) with the following comment (replacing the caption/caption): “Elephant are under the threat of extinction due to over hunting caused by man’s interest in ivory” (p.169). Unfortunately, these results are consistent with Pozzer and Roth (2003) argument that the “photographs and captions almost function in a standalone mode” (p.1108).

The majority of the photographs present the entities that were photographed in their normal/natural place (table 7). This means that agricultural machine is represented in growing field (ST3, p.165) or that a wind turbine is presented in a wind farm placed in a mountain (ST2, p.188). However, textbooks 2 and 3 include a considerable amount of photographs that present entities in a rather different place. For example, they show a piece of granite in an empty space (instead of showing it in a quarry). In doing this, they reduce the photographs contextualizing power and consequently their educational role. Similar results were found by Dourado, Morgado and Leite (in press) which also found that physical sciences textbooks may show up to one third of the entities out of their natural place.

Table 7: Contextualization of the entities shown in the photographs used by textbooks when dealing with the theme (%)

Contextualization	ST 1 (n ₁ =275)	ST 2 (n ₂ =225)	ST 3 (n ₃ =296)
Yes	94,5	76,9	63,9
No	5,5	23,1	36,1

Whatever the textbook, the majority of the photographs it uses when dealing with the theme focus on concrete everyday entities that are familiar to students (table 8). They are not very much useful and may even act as students’ distractors. The remaining photographs focus on processes that students are supposed to analyse and gain understanding on. Of course, these are the most valuable photographs from an educational point of view. However, textbook 2 differs from the others as its percentage of photographs that focus on processes (48,0%) is double of the other ones.

Table 8: Nature of the entities shown in the photograph used by textbooks when dealing with the theme (%)

Entities photographed	ST 1 (n ₁ =275)	ST 2 (n ₂ =225)	ST 3 (n ₃ =296)
Concrete entities	74,2	52,0	61,1
Processes	25,8	48,0	38,9

As shown in table 9, the concrete entities that are photographed include animals (e.g., a chicken, a rabbit, a cow, (ST2, p.179)), food (e.g., tomato, cheese (ST3, p.162)), places (e.g., River Douro mouth (ST1, p.193), forest (ST3, p.232), Cliff (ST1, p.233), lake (ST1, p.172)), etc. Including them does not add to students’ understanding of the science content that is being approached and does not play a meaningful role in students’ interpretation of photographs. Therefore, as Perales (2008) would argue, most of them are dispensable.

Table 9: Entities included in the photographs that focus on concrete entities (%)

Concrete entities photographed	ST 1 (n ₁ =204)	ST 2 (n ₂ =117)	ST 3 (n ₃ =181)
Food	0,0	6,0	8,3
Animals	12,3	14,5	13,8
People	1,5	0,0	0,0
Places	68,1	20,5	16,6
Objects	18,1	59,0	61,3

Table 10 shows that textbooks include photographs from three different types of processes. In textbooks 1 and 2 the majority of this type of photographs is related to industrialization (e.g., photovoltaic panels (ST2, p.174), thermal power plants (ST1, p.197), etc.). Even though this type of photographs also prevails in textbook 3 (40%), this textbook is the one that shows the best equilibrium among the three types of photographs (table 9). Human activities such as fishing (ST2, p.206), waste separation (ST3, p.223) and resources uses (e.g., producing daily life materials from minerals (ST2, p.181); producing energy from water (ST1, p.214)) are other types of processes shown in photographs by the three textbooks. However, it may happen that photographs are more helpful for students to learn about labelling structures and describing the phases of a process, than to learn about the overall process as a whole (Cook, 2008).

Table 10: Types of processes shown in the photographs used by textbooks when dealing with the theme (%)

Process photographed	ST 1 (n ₁ =71)	ST 2 (n ₂ =108)	ST 3 (n ₃ =115)
Human activities	28,2	12,0	29,6
Resources use	16,9	22,2	30,4
Industrialization	54,9	65,7	40,0

In all the textbooks, the majority of the photographs that are integrated along the text are related to the content presented (table 11), even though in textbook 2, the majority of them is not explicitly mentioned in the text. All textbooks use a few photographs that are neither related to the content presented nor explicitly mentioned in the text. Textbook 1 is the one that uses more photographs in such a way, namely to work as a background to beautify the page. These photographs have selling purposes Cook (2008) and are dispensable (Perales, 2008) because they may hardly facilitate or enhance learning.

Table 11: Relationship of the photographs integrated along the text with the text itself (%)

Relationship of the photographs with the content		ST 1 (n ₁ =232)	ST 2 (n ₂ =202)	ST 3 (n ₃ =212)
Related to the content presented	Explicitly mentioned	38,4	0,0	98,6
	Not explicitly mentioned	15,5	98,0	0,0
Not related to the content presented nor explicitly mentioned	Simply add new information	0,0	0,5	0,0
	Work as a background to beautify the page	46,1	1,5	1,4

CONCLUSIONS AND IMPLICATIONS

Research results show that the textbooks analysed are different with regards to photographs use. However, there are some limitations that are common to all of them and also that compare to those encountered in the literature reviewed. In fact, textbooks show photographs that, in most cases: are integrated along the text and aim at illustrating contents being presented. Nevertheless, most of them focus on entities and situations familiar to students and have a reduced or even null added educational value. In some cases (especially in one textbook), a considerable amount of photographs: do not have a caption; are not mentioned in the text; are not related to the content presented. This way of using photographs can hardly help students to build a bridge between science and everyday life and to perceive the relevance of science education and it may impair their role of mediators between science knowledge and students everyday world.

These findings have implications for textbooks illustrators, textbook authors and, of course, for teachers. The first one is that textbooks illustrators need to understand the impact of visual images on students as well as how they interpret them. The reason for this is that, as Cook (2006) pointed out, they need to be able to decide “what information they include to illicit students prior knowledge, and what information they include to foster

comprehension of new concepts” (p.1087).

The second one is that textbook authors need to have good criteria to choose the visual content namely the photographs that they select to be included in their textbooks. As suggested by López-Manjón and Postigo (2014), textbook images should help to overcome the usual difficulties faced by students. To be able to do so textbooks should have a cognitive-driven design, and adopt some principles like contiguity of text and illustrations and appropriate use of captions. Results obtained by Cheng, Chou, Wang and Lin (2015) with modified textbooks are a good incentive to intervene at this level.

The third implication, and probably the most important one, is that teachers need to spend time and effort talking through the meaning of the images with their students (Stylianidou, Ormerod & Ogborn, 2002). As it was argued above, reading science textbook pictures is not at all trivial for students. Besides, “visual images are a language and visual literacy can be learned [and needs to be learned], just as reading and writing are learned” (Cook, 2008, p.3). As Anagnostopoulou, Hatzinikita and Christidou (2012), emphasised, “The language of science is an integration of texts, visual images (i.e. diagrams, pictures, graphs, maps, tables, charts) and mathematical expressions (i.e. equations). Learning and teaching science means also learning and teaching the media of science communication.” (p.1039). This means that students need to be taught about how to read images used in science as well as in science teaching.

Thus, being aware of the features photographs that may present obstacles to students may be a good start to improve the educational value of photographs. Stylianidou, Ormerod and Ogborn’s (2002) have listed a set of images features that may present difficulties to students and that can also be useful for doing a critical analysis of photographs either when writing and illustrating a textbooks or when using it. Teacher education should tackle this issue, both in undergraduate and in post-graduate degree leading programs, as well as in in-service short courses. Prospective and in-service teachers should be asked and helped to critically analyse photographs included in textbooks so that they develop critical analysis competences and an awareness of the difficulties the visual devices, in general, and, photographs, in particular, can present to students. To succeed in doing so, teacher educators would benefit from research focusing not only on the analysis of visual material included in the textbooks but also from students’ and teachers’ interpretation of such material. This is especially important because research (Colin, Chauvet & Viennot, 2002) has shown that teachers are not sensitive enough to the fact that images may be misleading to students. This is also the reason why we would argue for future studies focusing on students’ and teachers’ interpretation of photographs and on textbook authors’ conceptions about the visual information and the pedagogical role(s) it should play in a science textbook.

People say that ‘an image is more than 100 word’. It one trusts it, than there are strong reasons for concern with textbooks; images should be good enough and they should not convey wrong meaning to students. Attaining this goal would require appropriate education to be organized and offered to teachers, so that they can resist to commercial goals and defend educational principles.

References

- Ahtineva, A. (2005). Textbook analysis in the service of chemistry teaching. *Universitas Scientiarum*, 10, 25-33.
- Anagnostopoulou, K., Hatzinikita, V. & Christidou, V. (2012). PISA and biology school textbooks: the role of visual material. *Procedia - Social and Behavioral Sciences*, 46, 1839-1845.
- Cheng, M-C., Chou, P-I., Wang, Y-T. & Lin, C-H. (2015). Learning effects of a science textbook designed with adapted cognitive process principles on grade 5 students. *International Journal of Science and Mathematics Education*, 13, 467-488.
- Colin, P., Chauvet, F. & Viennot, L. (2002). Reading images in optics: Students’ difficulties and teachers’ views. *International Journal of Science Education*, 24(3), 313-332.
- Cook, M. (2006). Visual representations in science education: the influence of prior knowledge and cognitive load theory on instructional design principles. *Science Education*, 90, 1073-1091.
- Cook, M. (2008). Students’ comprehension of science concepts depicted in textbook illustrations. *Electronic Journal of Science Education*, 12(1), 1-14.
- Devetak, I. & Vogrinc, J. (2013). The criteria for evaluating the quality of the science textbooks. In. M. Khine (Ed), *Critical analysis of science textbooks* (pp.3-15). Dordrecht: Springer.
- Dimopoulos, K., Koulaidis, V. & Sklaveniti, S. (2003). Towards an analysis of visual images in school science textbooks and press articles about science and technology. *Research in Science Education*, 33, 189-216.
- Dourado, L., Morgado, S. & Leite, L. (in press). O mundo real e o conhecimento científico nos manuais escolares de ciências físico-químicas: o papel mediador das fotografias. In *Actas do XVI ENEC*, Lisbon: University of Lisbon,
- Gilbert, J. (2006). On the nature of “context” in chemical education. *International Journal of Science Education*, 28(9), 957-976.
- Johntson, R. (2011). Science education and education for citizenship and sustainable development. *Collected Essays on Teaching and Learning*, 4, 107-114.

- Kim, T-H., Kong D-Y. & Lim, J-D. (2011). Analysis on types and contents of photos relating to geodiversity suggested in science textbooks for middle school. *Journal of Korean Nature*, 4(3), 185-190.
- King, D. (2012). New perspectives on context-based chemistry education. *Studies in Science Education*, 48(1), 51-87.
- Lavonen, J., Byman, R., Uitto, A., Juuti, K. & Meisalo, V. (2010). Students' interest and experiences in physics and chemistry related themes. *Themes in Science and Technology Education*, 1(1), 7-36.
- Lee, V. (2010). Adaptations and continuities in the use and design of visual representations in US middle school science textbooks. *International Journal of Science Education*, 32(8), 1099-1126.
- Leite, L. (1999). Heat and temperature. An analysis of how textbooks deal with these concepts. *European Journal of Teacher Education*, 22(1), 75-88.
- Leite, L. (2002). Experiments to promote students conceptual change on heat and temperature: how do Portuguese text-books include them?. In *Teacher's professional knowledge and reference disciplines of teacher education*, (pp.391-410). ISBN: 3-93622-02-2. Leipzig: University of Leipzig.
- Leite, L. & Afonso, A. (2001). Portuguese school textbooks' illustrations and students' alternative conceptions on sound. In *Physics Teacher Education Beyond 2000* (pp.167-168). Paris: Elsevier.
- López-Manjón, A. & Postigo, Y. (2014). Análisis de las imágenes del cuerpo humano en libros de texto españoles de primaria. *Enseñanza de las Ciencias*, 32(3), 551-570.
- Martins, I. (2011). Ciência e cidadania: perspectivas de educação em ciência. In L. Leite et al., *Actas do XIV ENEC* (pp.21-31). Braga: University of Minho.
- Perales, F. (2008). La imagen en la enseñanza de las Ciencias: alguns resultados de investigación en la Universidad de Granada, España. *Formación Universitaria*, 1(4), 13-22.
- Pozo, J. & Gomes, M. (1998). *Aprender y enseñar ciencia: del conocimiento cotidiano al conocimiento científico*. Madrid: Ediciones Morata.
- Pozzer, L. & Roth, W-M. (2003). Prevalence, Function, and Structure of Photographs in High School Biology Textbooks. *Journal of Research in Science Teaching*, 40(1), 1089-1114.
- Roth, W., Pozzer-Ardenghi, L & Hans, J. (2005). Photographs in biology texts. In. W. Roth, L. Pozzer-Ardenghi & J. Hans (Eds), *Critical graphicacy: understanding visual representation practices in school science* (pp.83-108). Dordrecht: Springer.
- Stylianidou, F, Ormerod, F. & Ogborn, J. (2002). Analysis of science textbook pictures about 'Energy' and pupils' readings of them. *International Journal of Science Education*, 24(3), 257-283.
- Sullivan, J. (2008). The use of photographs to portray urban ecosystems in six introductory environmental science textbooks, *Journal of Research in Science Teaching*, 45(9), 1003-1020.

Practical Problems Of University Students' Learning And Performance Assessment

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ABSTRACT

Assessment of knowledge, skills and competencies of university students is one of the elements of a learning process which uses feedback from the acquired knowledge, skills and competences. It enables to classify the level of students' learning by assessing their knowledge, skills and competences acquired during the study of a particular subject. It constitutes one of the most important forms of communication between university teachers and students. Assessment can be understood also as an activity the consequences of which can not only help but also harm the student. The quality of assessment should be in the centre of attention of university teachers because it places considerable demands on the teacher's pedagogical thinking, on the ability to assess their own pedagogical activities and to correct them thoughtfully according to the situation. The aim of this paper is to present theoretical knowledge about students' learning, skills and competencies assessment and, at the same time, to highlight the practical problems associated with this assessment. In conclusion, the contribution includes recommendations for improvement of efficiency and quality of university students' assessment.

Keywords: assessment, knowledge, performance, university, teacher, student

INTRODUCTION

In order to increase the employment of its students the University of Žilina implemented several types of projects with the objective to provide qualified graduates with necessary knowledge and skills for practical life. The situation of graduates from the University of Žilina on the labor market has been as follows: Statistical data from the Office for Labor, Social Affairs and Family of the Slovak Republic in the period 2012-2014 imply that the share of university graduates on the total number job applicants doubled in 2013-2014 in comparison with 2012. Meanwhile, in 2014 the total number of job applicants in the country decreased by 12.24 % (in 2014) and in the region by 11.01% (Table 1, Figure 1) (Boc, 2015).

Table 1: Numbers and shares of unemployed university graduates in the Slovak Republic and in the Žilina region in 2012-2014. (Statistical data from the Office for Labor, Social Affairs and Family of the Slovak Republic, In: Boc, 2015)

Year	Slovak Republic [number of persons]		Žilina region [number of persons]		Index of university graduates – job applicants [number of persons]	
	Total	University graduates	Total	University graduates	Slovak Republic	Žilina region
2012	425858	3524	45868	351	82,75	76,52
2013	398876	6480	44945	844	162,46	187,79
2014	373754	6352	40782	816	169,95	200,09

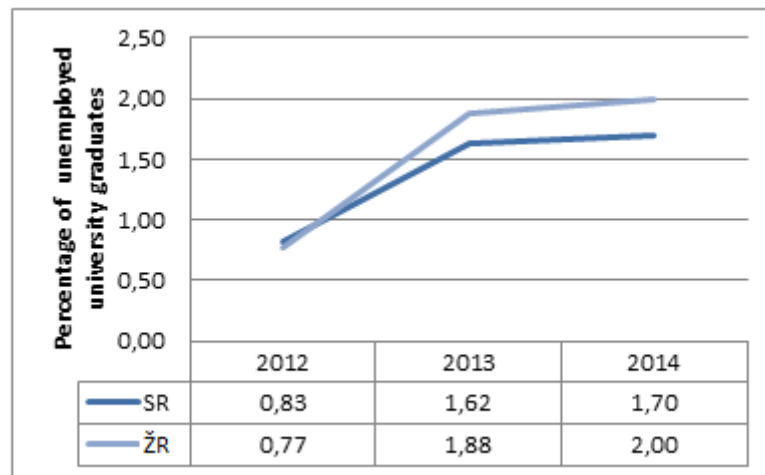


Figure 1: Comparison of the percentage of university graduates – job applicants in 2012-2014 in the Slovak Republic and Žilina region (Source: Statistical data from the Office for Labor, Social Affairs and Family of the Slovak Republic, In: Boc, 2015)

In the monitored period the situation in placement of university graduates in the Žilina region was worse than in the national scope. Since 2013 there has been a growing trend in unemployment of university graduates which in 2014 exceeded the national average share by 0.30%. The chances of the graduates in practice strongly depend on their knowledge, skills and competences acquired in the course of their university studies.

The European Qualifications Framework for lifelong learning defines three categories of educational outcomes – knowledge, skills and competences – which are also the subject of assessment in university students. From the viewpoint of content and demands, there are 3 levels of individual and acquired or learned dispositions, while the first level is represented by knowledge (the lowest level of educational outcomes), the second level is represented by skills (the next higher level) and the third level is represented by competences (the highest level of educational outcomes) (Blašková, 2013).

Knowledge, skills and competences are characterized as follows (EC, 2009):

- Knowledge is a result of acquired information through learning. It is a set of facts, principles, theories and procedures which relate to the spheres of work and study. In the context of the European Qualifications Framework knowledge is described as theoretical and/or factual.
- Skills represent the ability to apply knowledge and to use know-how to perform tasks and to solve problems. In the context of the European Qualifications Framework skills are described as cognitive skills (including utilization of logical, intuitive and creative thinking) or practical skills (requiring manual workmanship and application of methods, materials devices and tools).
- Competence is a demonstrated ability to use knowledge, skills and personal, social and/or methodological abilities in working or study situations and in the professional and personal development. In the context of European Qualifications Framework competence is described in relation to responsibility and independence.

Knowledge and skills focusing on one specific situation become quickly obsolete and useless. Therefore it is necessary to develop also competences (skills, abilities, knowledge, attitudes) which can be used in most occupations and which make it possible for the individual to take up different positions, to handle unpredictable problems, to cope with fast changes at work and in the personal and social life.

Key competences are supposed to be used to solve many problems and to achieve goals in different spheres of social and personal life of the person. They include, particularly, information competences (information and computer literacy), teaching competences, cognitive competences (solving of problems, critical and creative thinking), communication competences, interpersonal competences (ability to live and to work effectively with other people, to learn with them and from them) and personal competences (Dubovská, 2015).

FORMS OF ASSESSMENT OF STUDENTS' KNOWLEDGE, SKILLS AND COMPETENCES

Assessment of knowledge, skills and competencies of university students is one of the elements of a learning process which uses feedback from the acquired knowledge, skills and competences. It enables to classify the level of students' learning by assessing their knowledge, skills and competences acquired during the study of a particular subject. It constitutes one of the most important forms of communication between university teachers and students. Assessment can be understood also as an activity the consequences of which can not only help but also harm the student. The quality of assessment should be in the centre of attention of university teachers because it places considerable demands on the teacher's pedagogical thinking, on the ability to assess their own pedagogical activities and to correct them thoughtfully according to the situation (Blašková, 2013).

In connection with the assessment of students literature uses the expressions "assessment" and "evaluation". The two terms are normally used as synonyms but in professional pedagogical terminology they are understood and applied differently.

Evaluation is understood as a process or result of objective evaluation of data which characterize quality and efficiency of various aspects of education (e.g. objective, content, methods, means, forms, conditions and results of the students, study programs, faculties, universities etc.). Evaluation provides information about the whole pedagogical reality for the purposes of pedagogical theory and pedagogical practice. It should evaluate, as objectively as possible, quality of the educational programs, educational needs, training of teachers, educational environment etc.

The term "evaluation" is broader than that of "assessment" because it covers evaluation of theory, methodology and practice of the most diverse phenomena relating to education.

The term assessment is more frequently used in the context of university practice, primarily in connection with assessment of knowledge of the students, as well as the work of university teachers.

Assessment represents a process of determination of the level of knowledge, skills and competences of students by means of certain diagnostic techniques and their comparison with previously outlined objectives. It is not understood only as a quantitative process (grading – marking = classification) but also as a qualitative assessment of the students' results.

The methods and forms of assessment can be classified based on several criteria. The assessment is based on comparison.

Based on the objective the assessment can be formative or summative.

- **Summative assessment** – the objective is to determine results of the student's learning process and the levels of his knowledge, skills and competences. It is usually associated with classification of the students.
- **Formative assessment** – the objective is feedback, i.e. acquisition of information to further improve a particular performance or activity. It is oriented at support of effective learning of the student and it provides advice, guidance and instructions to improve his future results. One example of formative assessment are comments and correcting of student's work, dialogues of team members or investigators working on a student research project, assessment of students' communication during teamwork etc.

Formative assessment is not usually connected with classification of students.

Based on the reference used to compare the student's performance we can recognize:

- **Differentiation assessment** – or assessment of relative performance, which compares the student's performance with that of other students, as a rule with the average performance of the concerned students.
- **Verification assessment** – or assessment of absolute performance. The student's performance is compared with a previously set-up standard.
- **Individualized assessment** – the student is compared with the level of his own capacities and abilities, i.e. with himself in the course of time.

Based on the awareness of the student the assessment can be classified as:

- **Formal** – students are informed about the assessment in advance and they can prepare for it,
- **Informal assessment** – is based on observation of common activities of the students in the teaching process.

The **assessment** may focus on the **course of activity** of the students, e.g. laboratory exercise, or on **results of the activity**, e.g. assessment of a completed didactic test, completed model, drawing etc.

The assessment can be performed by a teacher who teaches the students and then the process is called **internal assessment**, or by an external assessor (teacher from another school, expert from practice etc.), and the process is then called **external assessment**.

INTERACTION BETWEEN A UNIVERSITY TEACHER AND STUDENTS AND ITS EFFECTS ON THE ASSESSMENT

The interaction and quality of relationship between a teacher and a student significantly affects the teacher's impact on the student. The method of interaction and the relationship between the teacher and the student depend on the capability of the teacher, as well as on the capability of the student, to perceive and to assess the other person based on various relatively independent criteria; it also depends on the capability to objectively assess all personal characteristics and not to rely on a single experience, single significant manifestation or feature. However, the teacher and the student are not always sufficiently mature to reasonably assess all properties and manifestations of the other person and to get an objective picture. Therefore in some cases the assessment of the student by the teacher does not truly reflect the student and his performance. In this connection there may be various interpretations and attitude demonstrations which are affected by the character of the relation between the teacher and the student, which include (Chmelárová et.al, 2010):

- **Pygmalion effect** – mechanism of positive influencing of the student's characteristics and results by the fact that the teacher positively expects favorable changes and favorable outcomes. As a result of the assumption, the teacher applies an interaction with the student which significantly contributes to positive changes and improvement of the student's performance.
- **Golem effect** – it is the opposite of the Pygmalion effect, i.e. that the teacher assumes and expects weak or insufficient performance and in the end actually causes its worsening.

The Pygmalion and Golem effects are significant at universities particularly during exams in which the teacher under the influence of his expectations or assumptions can, verbally or non-verbally, contribute to a better or worse performance of the student.

Halo effect – is a generalization of the student's assessment based on a single characteristic, property or experience by which the assessor was strongly impressed. It may be positive (we ascribe to the person other positive properties after we have seen one positive property) or negative (we ascribe to the person other negative properties).

One of the properties to which teachers often respond with the halo effect is strenuousness. If the teacher finds the student strenuous he often overvalues his abilities and improves assessment of his performance. A better grade as a result of strenuousness may have a negative impact on the student's personality, e.g. inadequate improvement of the student's notion of himself, which may lead to excessive increase of self-confidence and subsequently non-acceptance of teacher's authority. University teachers often experience consequences of such overvaluation of strenuousness at secondary schools. At the university level it is impossible to replace lack of abilities with strenuousness. Students with high self-confidence acquired in this way often quickly lose their belief in themselves after the first failure and such disappointment may lead even to tragic consequences (suicide).

A very important sphere in which the halo effect plays an important role are the student's previous school results and performance. The halo effect can explain stability of grades throughout the whole time at school. If the teacher cannot decide about how to assess the student he usually tends to look at the previous assessment or the opinion (assessment) made by his colleagues.

In this way personal appearance, behavior and information about the family background may also influence the student's assessment, both positively and negatively.

Typification and preferential attitudes are other specific effects which operate in the interaction between the teacher and the students. Typification means classification of students as certain types or sub-groups. Preferential attitudes mean stronger focus on certain students.

The teacher interacts differently with students classified as individual types, which the teacher sees either positively or negatively, and thus creates different conditions for their success, development of self-confidence etc. Students are frequently classified based on their study results but also based on gender. Differentiation

between male and female students is fairly common at technical universities because some teachers are still prejudiced against women and they think that girls are not good enough to study technology or some specific specializations (e.g. nuclear engineering).

Another interpretation and attitude demonstration of the relationship between the teacher and the student is the teacher's approach to the student which depends on teacher's belief about the causes of the student's achievements and failures.

If the teacher ascribes student's achievements to internal and stable factors (student's abilities) and his failures to external and changing factors (e.g. bad luck when choosing a question for the exam etc.), we refer to **activating attributions**. The teacher assumes that every student has certain internal prerequisites to achieve a certain level of success. If the student fails the teacher stresses the factors which the student can eliminate with his own efforts. He thus contributes to the full utilization of the student's abilities and develops his self-confidence.

If the teacher ascribes student's success to external factors and the failure to internal factors then we refer to **de-activating attributions**. They frequently result in student's resignation (why should I learn if the teacher thinks I am incapable and I will not get a better grade anyway...).

An important factor affecting the teacher's relationship and interaction with students is whether the teacher believes that the student is successful. The teacher interacts with such a student differently and the assessment is different (e.g. some teachers prefer students with an impulsive cognitive style, while others prefer reflective cognitive style. One teacher's notion of a successful student can be associated with certain external or internal characteristics which may be totally uninteresting or irrelevant for another teacher, e.g. his hairstyle, clothing, behavior etc.

On the student's side, the interaction can be affected also by the so-called unsuccessful personality syndrome or the learned helplessness syndrome. Both the cases represent a kind of a "complex", an internal mental factor created based on previous negative experience, in this case associated with failure at school. If the failure in the same or similar situation repeats several times then it becomes such a strong factor that it may adversely affect the student's behavior and experience in a similar situation in the future.

In respect to all the mentioned factors affecting the interaction it is essential for the teacher to be aware of them and their potential impacts on the student's personality and to work on himself to rectify his conduct and actions in contact with the students.

CONCLUSIONS

Results of university education represent a specific outcome with expectable specific content which reflects binding documents regulating the respective accredited study program and they are also dynamically confronted with current demands of the practical life and market. According to the ECTS User Manual (2009), education outcomes summarize what the student is expected to know and to understand and what he is able to prove after his education process is completed (Verešová, Čerešník, 2013).

The improvement of efficiency and quality of assessment of education outcomes of university students can be achieved by implementation of the following recommendations. The assessment shall have a previously specified clear methodology for evaluation and measuring of results. The objective is to achieve the highest possible validity and reliability of the assessment, to assess the right facts and to make the assessment accurate and reliable. Another recommendation is to create a portfolio in which the teacher keeps works of each student in the long term (results of tests, measuring protocols, projects, papers, teacher's records about observation of the student, etc.). This will allow the teacher to monitor the direction, substance and scope of changes in the student's learning process. The portfolio will provide a comprehensive view of the student and will allow students with different learning styles to succeed.

During exams and assessment the teacher should create a positive atmosphere and minimize stress by means of positive motivation. It is recommended to prefer formative assessment which tells the student how to improve his results and how to avoid mistakes and shortcomings in the learning process and to make it more efficient. The assessment and classification should follow as soon as possible after the assessed performance. In the opposite case the motivation effect of the assessment is diminished. The objective is to involve students into the assessment process as partners, e.g. the students may correct and evaluate their tests themselves based on previously specified criteria which also contributes to formation of their personal qualities, such as honesty, impartiality and demandingness. It is also recommended that students should perform self-assessment and they

should be assessed by their peers in order to learn to assess the others and to reflect on assessment made by others. Last but not least, it is recommended to apply various modern methods of development and evaluation of tests, e.g. IRT method (Item Response Theory), MDT method (Measurement Decision Theory) etc. High quality education outcomes, such as knowledge, skills and competences, which are also the subject matter of assessment of university students, represent a prerequisite for their success in practice.

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References

- Blašková, M. (2013). Metodika hodnotenia studentov. (Methodology for students assessment) Project: 26110230060 Rozvoj kultúry kvality na ŽU v Žiline na báze európskych štandardov (Development of quality culture at the University of Žilina based on the European standards. University of Žilina.
- Boc, K. – Vidríková, D. 2015. Aplikácia duálneho systému vzdelávania využitím metódy kontinuálnej simulácie činnosti virtuálnej *spoločnosti*. In: Riešenie krízových situácií v špecifickom prostredí : 20. medzinárodná vedecká konferencia : 20. - 21. máj 2015, Žilina. - Žilina: Žilinská univerzita, 2015. - ISBN 978-80-554-1021-0. - S. 59-66
- Dubovská, R., Lajčin, D. (2015). Didaktika odborných predmetov. (Didactics of professional subjects) [cit. 02.05. 2015]. Available at: www.siov.sk/ext_dok-dop/16351c
- EC. (2009). European Qualifications Framework for lifelong learning. Luxemburg: Office for issuance of official EC publications. ISBN 978-92-79-08489-8. doi 10.2766/28316
- European Commission. (2009). ECTS Users' Guide. Luxembourg: Office for Official Publications of the European Communities, 2009. ISBN 978-92-79-09728-7.
- ENQA. (2009). Standards and Guidelines for Quality Assurance in the European Higher Education Area. European Association for Quality Assurance in Higher Education, 2009, Helsinki. [cit. 02.05. 2015]. Available at: http://www.enqa.eu/wp-content/uploads/2013/06/ESG_3edition-2.pdf
- Chmelárová, Z., Sawicki, S., Kováč, K. (2010). Vybrané kapitoly z psychológie. Praktikum vysokoškolskej pedagogiky pre doktorandov. (Selected chapters from psychology. Practical exercise in university pedagogy for post-graduate students). [cit. 02.05. 2015]. Available at: http://www.mtf.stuba.sk/docs/doc/Informacie_o/rozvoj_SF_EU/Modul2.pdf
- Verešová, M., Čerešník, M. (2013). Výsledky vzdelávania a ich implementácia do študijných programov. (Education outcomes and their implementation into study programs). Nitra 2013. [cit. 03.05. 2015]. Available at http://www.kpsp.pf.ukf.sk/prilohy/vysledky_vzdel.pdf

Present And Future Of Nano-Bio-Technology: Innovation, Evolution Of Science, Social Impact

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ABSTRACT

In this work an interesting overview related to the appearance of nano-bio-technologies on the scientific and technological world scene is presented. Starting by the definition of nanotechnology, the scale of work, with the revolutionary associated perspectives, and the ways for operating at the nanometer level are considered. The analysis evaluates also the theoretical efforts for a deeper understanding of the dynamics at the nanoscale, arriving to the processes for testing the scientific data and for predicting new peculiarities and features of nanomaterials with new theoretical models. Important involved areas, related to technology, market and pure science, as well as the peculiar aspects of applied mathematics and the applications of materials and systems obtained through nano-technologies, are examined. It is considered the impact on people and nature, on environment and future, that nano-technologies are producing, ending with interesting aspects related to ethics, future of human society, responsible development, national policies and possibilities of resolution of the global economic crisis also through nano-technology.

Keywords: nano-technologies

INTRODUCTION

The question about the destiny of future is one of the constants in the public debate on the field of nanoscience and nanotechnology, which studies and manipulates the matter at atomic, molecular and macro-molecular scale. Nanotechnology is one of the current key areas of science and technology, with applications in crucial sectors of life and society: from medicine to environment, from information to technology and defense, up to unexpected and seemingly mundane everyday objects. About the effects, development and perspectives of these very small tools and products, enthusiastic and worry voices overlap, so as happy expectations and fears of unknown risks.

Representations of alternative futures, in a debate at different levels, through articles, books, services and TV documentaries, network voices, public meetings, act on our present influencing the processes of legitimation of decisions and therefore the same innovation. Its relevance is not limited to the field of nanotechnology, but it represents an essential aspect of the global debate on techno-science. There is not a universally accepted definition for nanoscience and nanotechnology, but there are several similar ones. According to that given in 2004 by the “Royal Society & The Royal Academy of Engineering”, UK (On-line^a):

Nanoscience is “the study of phenomena and manipulation of materials at atomic, molecular and macromolecular scales, where properties differ significantly from those at a larger scale”;

Nanotechnology is “the design, characterisation, production and application of structures, devices and systems by controlling shape and size at nanometre scale”.

Similar is the definition given in 2000 as part of the “National Nanotechnology Initiative” (NNI), USA (On-line^b):

Nanotechnology is “the understanding and control of matter at dimensions of roughly 1 to 100 nanometres, where unique phenomena enable novel applications. At this level, the physical, chemical, and biological properties of materials differ in fundamental and valuable ways from the properties of individual atoms and molecules or bulk matter”.

Nanoscience is the meeting point of different disciplines ranging from quantum physics to supra-molecular chemistry, from material science to molecular biology and represents an established reality in the research world. Nanotechnologies aim to exploit and apply methods and knowledge arising from nanoscience. They refer to a set of technologies, techniques and processes that require a multidisciplinary approach and enable the creation and utilization of materials, devices and systems with dimensions at the nanometer level. In summary, with nanotechnology we mean the ability to “observe, measure and manipulate matter at the atomic and molecular scale” (On-line^c).

1 nanometer (nm) is one billionth of a meter and it is roughly 10 times the size of the hydrogen atom, while the size of a simple protein is around 10 nm. The world of nanotechnology is in the range (1, 100) nanometers and we call *nano-products* those materials or devices in which there is at least one functional component with size of order or less than 100 nm [Figure 1].

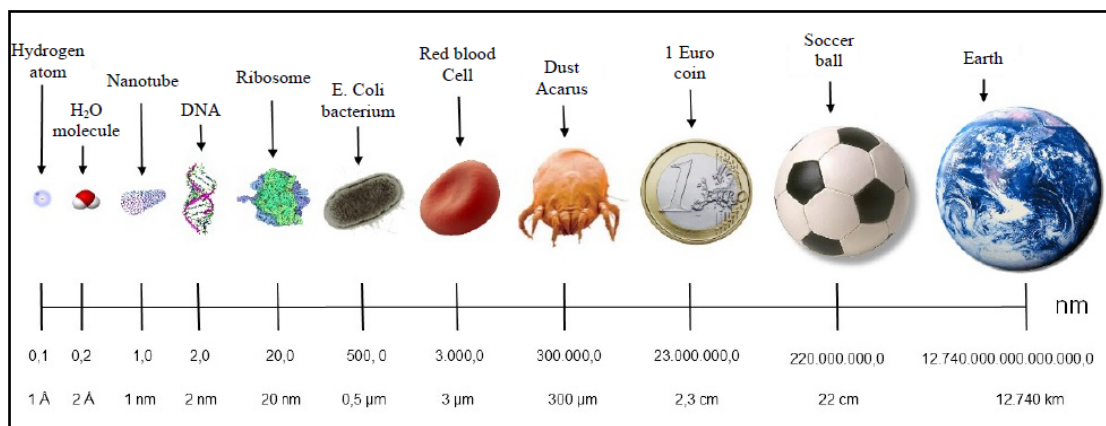


Figure 1: Nanometric scale from a hydrogen atom to Earth.

The revolutionary perspectives associated with nanotechnology derive from the fact that at this size the behaviors and characteristics of matter drastically change; nanotechnologies represent therefore a radically new way for producing materials, structures and devices with properties and functionalities greatly improved or entirely new.

There are two main ways for operating at the nanoscale:

- the so-called *top-down approach*: it means to reduce with physical methods the size of structures towards *nano* levels. The techniques of microelectronics, such as the electron beam or X-ray lithography, are taken back to this approach and constitute an important way for entering into the nano-world. The nano-electronics and nano-engineering are the election areas of this approach; nano-electronics is currently the most widespread application of nanotechnology;

- the so-called *bottom-up approach*: it is the approach in which, starting from small components, normally molecules or aggregates of molecules, scientists try to control and direct its assembly using them as *building blocks*, for creating both inorganic and organic-biological nanostructures [Figure 2].

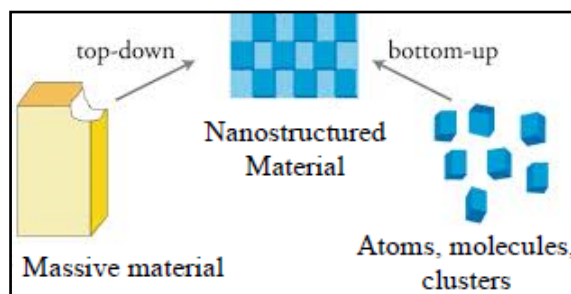


Figure 2: Top-down and bottom up approaches.

High expectations are associated with the bottom-up approach, i.e. the creation of structures at nanometric level, replicating in a controlled way processes that often already occur in nature, for getting the specific properties at nanoscale. The top-down techniques are currently more consolidated, while concerning the bottom-up techniques we are in a development phase and essentially confined to the laboratory level (On-line^d; Di Sia, 2013).

INVOLVED AREAS OF TECHNOLOGY AND APPLICATIONS

Several are the perspectives for the immediate future; there are numerous proposed applications in areas such as:

- *food packaging*, designed to increase the *shelf-life* (life on the counter) of products and for an active and smart packaging;
- *encapsulation* of active ingredients, for an increased stability and better miscibility;
- *formulation* of nutrients with increased bio-availability.

Numerous products arising from the use of nanotechnology are already available on the market, or about to be, and their number is constantly growing. Among them we have:

- nanoparticles for cosmetics or for coatings and paints;
- technical textiles and clothing;

- sporting goods;
- hard disks with nanostructured surfaces for recording data at very high density;
- memory chips with size of order or less than 100 nm;
- photonic devices;
- self-cleaning surfaces;
- systems for medical diagnosis based on the *lab-on-chip* principle;
- advanced systems for targeted delivery of drugs;
- more durable medical implants and with improved biocompatibility;
- advanced innovative materials for transport systems;
- new and improved production systems and energy storage.

The potential applications are literally endless; nanotechnologies are practically applicable in all productive sectors. It is expected the largest market volume for materials, electronics, pharmaceuticals, chemical processes, aerospace, health care, tools, sustainable processes, environment, alternative energies.

A lot of nanotechnology-based products are currently available; in detail:

1) *electronics for communications, sensoristics, electromechanical systems*: recording systems based on quantum nanostructures, ultra-flat screens, wireless technologies, new devices and processes for information and communication, non-volatile memories, Josephson junction systems with potentialities in the quantum computation;

2) *chemical products, materials for energetics, energy storage, contamination of the environment*: new batteries types, artificial photosynthesis for production of clean energy, new solar cells, reduction of polluting emissions for motor vehicles, aerogels, spongy highly porous materials endowed with nanostructured texture, photochemical cells, components of the combustion cells, new catalysis of petrochemical processes, new smart non-toxic and highly efficient nano-coatings;

3) *pharmaceutical products, health protection and sciences life, biomedical applications, cosmetic sector*: new systems of medicines release and genetic material for specific parts of the human body, biocompatible prosthesis, substitutes of physiological fluids, self-diagnosis tools, materials for the regeneration of bones and other tissues, nanosystems able to determine the sequence of single DNA molecules, particular designed drug-carrying nanoparticles;

4) *manufacturing industry, textile sector*: sinterized nanopowders with specific properties, biomimetic materials, plastics based on delayed inflammability, surface nanoparticles coverings for increasing the resistance to usury and chemical corrosion, nanoparticles for inks and dyes, ceramic materials with increased hardness, cutting instruments of extraordinary hardness and reduced fragility, ductile cements, nano-electro-devices embedded into textiles for providing special support systems, artificial nanofibres providing flame retardancy, shock-absorbency;

5) *environment, safety, monitoring*: selective membranes for contaminants filtration, nanostructured traps for pollutants removal, detoxicators of chemical and biological agents, new cheap nanosensors for fast and accurate pollution monitoring;

6) *food and drink*: nutraceuticals and functional foods, new tastes, flavours and textures, packaging providing a better barrier against contamination, nano-encapsulation techniques (On-line^{e, f, g}; Di Sia^{a, b}, 2014) [Figures 3, 4].

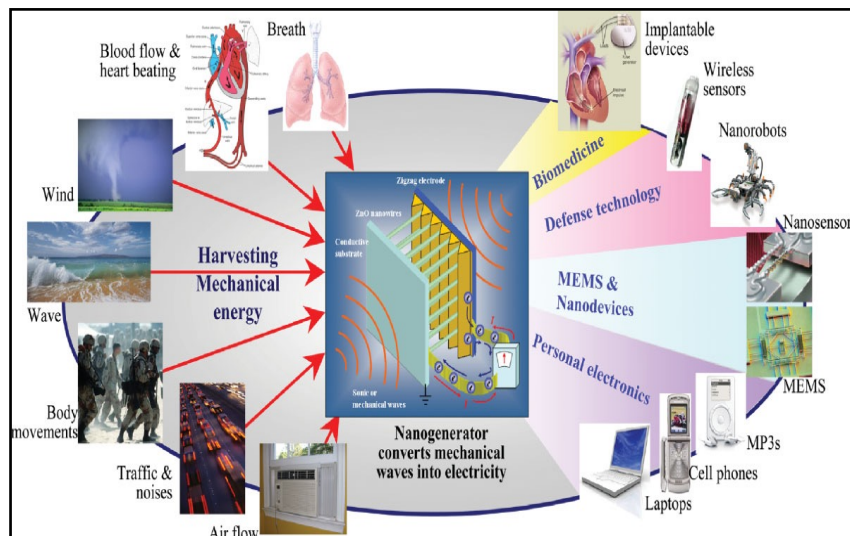


Figure 3: Conversion of energy with nanogenerators (picture: courtesy prof. Z. L. Wang).

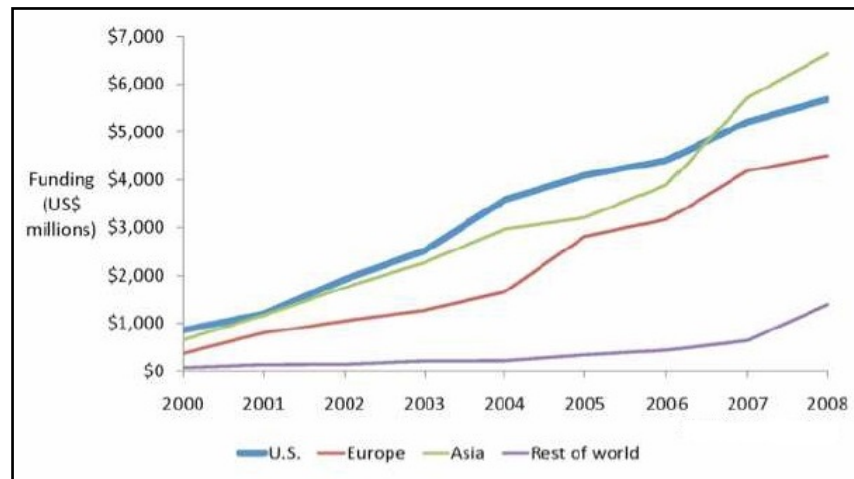


Figure 4: Total funding for nanotechnology by year in the world (source: Lux Research).

INVOLVED SECTORS OF SCIENCE AND MATHEMATICS

During last years, the essential techniques of theory, modelling and simulation developed a remarkable progress in the new field of nanoscience (Di Sia, 2011; Di Sia, 2012; Di Sia^c, 2014). This period saw the development of particular algorithms of calculation, Monte Carlo classical and quantum techniques, *ab initio* molecular dynamics, mesoscale methods for soft matter. Simultaneously, advances in computing hardware have increased the computational power of many orders of magnitude. The combination of new theoretical methods with computational power has made possible the simulation of systems with millions of freedom degrees. Efforts for the creation of new predictive theoretical models, both at numerical and at analytical level, are bringing important results.

Nanoscience poses new challenges to the mathematical representation and to the multiscale analysis. Models and mathematical algorithms must cover the range from discrete to continuous, from deterministic to random. The use of fast algorithms allows big simulations, including in a model a lot of atoms and functions and can simulate detailed physical processes. New methods can predict electronic and structural properties without previous empirical knowledge and/or without experimental input.

Current important investigation areas are:

- i) *nano-constituents* (nanotubes, quantum dots, clusters, nanoparticles),
- ii) *complex nanostructures* and *nano-interfaces*,
- iii) *assembly* and *growth* of nanostructures,

in relation to:

- a) deep interpretation of transport mechanisms at nanoscale,
- b) realization of theoretical and simulation models for complex and heterogeneous nanoscale systems,
- c) accurate simulation of the optical properties of nanoscale structures,
- d) simulation of complex nanostructures involving *soft* and *hard* structures and nano-interfaces between *hard* and *soft* matter,
- e) simulation of self-assemblings,
- f) quantum coherence, decoherence and spintronics,
- g) development of self-validating methods.

The role of applied mathematics in these areas is fundamental, for formulating new theories and developing new computational algorithms.

The experimental techniques for the controlled fabrication of nanotubes and nanocrystals, quantum dots and wells, produced an entirely new set of elementary nanostructures.

The growth of fast workstations, cluster computing, new generations of massively parallel computers, completes the picture of the transformation of theory, modelling and simulation of the last years.

Three big classes of nanosystems can be considered:

- 1) *Nano-building blocks*, such as nanotubes, quantum dots, clusters, nanoparticles, which can be sinterized in a completely reproducible way and experimentally well characterized. They are the central element of the new nano-mechanical, nano-electronic and nano-magnetic devices. It is believed that the best characterized building blocks are cluster, molecular nanostructures, nanotubes, nanowires, films and quantum dots [Figure 5].

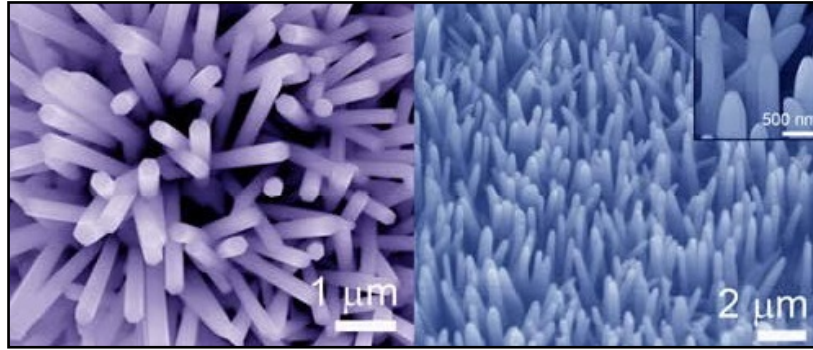


Figure 5: Nanowires going down in length scale.

2) *Complex nanostructures and nanointerfaces*. Central for nanoscience is the assembly and manipulation of the fundamental building blocks for creating structures, materials and functional devices. The large surface/volume ratio, due to the prevalence of nanointerfaces, combined with the complexity of nanointerfaces and nanostructures, offers various challenges in the development of predictive theories in nanoscience.

3) *Dynamics, assembly and growth of nanostructures*. Central aspects of this sector are the transport properties and dynamic processes leading to their creation, in particular the self-assembly. There is a wide variety of relevant transport mechanisms in nanoscience, which include the electron transport (in molecular electronics, in nanotubes and nanowires), spin transport (in the devices based on spintronics) and molecular transport (relevant in biological and chemical sensors, membrane/molecular separations and nano-fluidity) [Figure 6].



Figure 6: Aerogel, the part on which there is the flower is at room temperature, despite the direct contact of the flame.

In every field of science there is the need to estimate the parameters of the system, to find the extremes of the function object of study; mathematical models are so a guide to experimentation and for predicting the right characteristics. Complex nanosystems can have millions or billions of particles, leading to huge optimization problems characterized by a very high number of local minima with energy levels close to the ground state. It is very important the creation of statistical methods to develop a final statement of confidence in the response, recognizing all the possible sources of errors in the process. Modular optimization, statistical algorithms and software must be developed in a context that provides tools for scientific understanding (Di Sia, 2013; Di Sia^a, 2014; Di Sia^b, 2014) [Figure 7].



Figure 7: OLED ultra-flat deformable screen (by Sony).

FOOD AND ENVIRONMENT IMPACT

The incoming of nanotechnologies in the food sector raised new questions about possible risks for consumer health and required new instructions, which regulate the labeling and the presence of these components. Toxicology applied to these nano-elements must therefore go hand in hand with new discoveries and new applications. At the moment there are some food additives, used for a long time, such as silicon dioxide and titanium dioxide, for which it has realized that a fraction is present in nano-form. There are also nanomaterials authorized for use in plastics and in articles intended to contain foodstuffs, as carbon black, silicon dioxide and titanium nitride, the latter authorized for use in *PET* (Polyethylene terephthalate) bottles.

Toxic effects of specific nanomaterials *in vitro* and *in vivo* have been observed, but more statistical data on oral exposure and from studies of sufficient duration and realistic doses must be collected. The departments of public health and food safety are working in this direction. There are also several European projects, from *Nanogenotox* to *Nanoreg* (On-line^b, On-lineⁱ), that can give useful answers to the risk assessment.

Another important point is the evaluation of the effect of digestive process on nanomaterials in foods. If the nanoparticles or their aggregates in foods are completely degraded and solubilized by the digestive process, there is not possibility of absorption of nano-objects. Conversely, gastrointestinal digestion can generate new particles (Szakal et al., 2014; Joseph & Morrison, 2006).

The currently developed nanotechnologies in food are mainly aimed to improve the nutritional value of food, the taste or safety, to optimize production processes. Applications of nanotechnology directly on foods and drinks are under research and development, given the sensitivity of the matter.

The packaging industry is promising for the use of nanotechnology in the food industry, but it raised many questions about their safety in food contact and actual consumer exposure.

The main applications of nanotechnology in the environmental field include:

- nanofiltration,
- drainage of soils and waters,
- photocatalysis of pollutants,
- use of nanosensors in industrial or drainage activities,
- improve of selectivity of pesticides and water conservation.

Many applications of nanotechnology to soil drainages or other environmental matrices have been tested in laboratory and at pilot scale, but their effectiveness and safety have yet to be confirmed in large-scale deployments (Joseph & Morrison, 2006; Di Sia^d, 2014).

Applications of nanotechnology in catalytic processes for reducing air pollutants are widespread. Thanks to the increased specific surface area of nanostructured materials, their efficacy as catalysts is much higher than the corresponding materials at a larger scale. A widely used catalyst is titanium dioxide (TiO₂), which is able to dissociate, for example, nitrogen oxides produced by vehicular traffic.

The treatment with nanomaterials for the construction and roofing artifacts gives self-cleaning and anti-pollution power, thanks to the joint action of sunlight. An example of application of nanotechnology in the energy sector are the new semiconductor nanoparticles in thin solar panels. This technology seems to provide better efficiency and lower production costs.

Nanomaterials are characterized by new properties, therefore can expose humans and the environment to new risks; the available knowledge on behaviour of chemical substances are still not sufficient to conjecture the behaviour of the same substances in the nanometric form.

The greater reactivity and mobility of nanoparticles with respect to the corresponding at bigger dimensions implies that the metabolic pathway could be different from the known one. The target organs, the elimination times, the accumulation mechanisms and the recombination in aggregates of nanoparticles are unique aspects

that require further research. Nanoparticles are of the same scale of the DNA, therefore there is the possibility that they can interact with it directly, causing possibly dangerous changes to the genetic code (On-line¹). The current regulatory framework is able to cover in principle the potential risks to health, safety and environment of nanomaterials. At the request of the European parliament, it has been introduced specific provisions with regard to nanomaterials for legislation on cosmetics, novel foods and food additives, with possible regulatory changes in relation to the progress of research in this area.

ETHICS, POLITICS, SOCIETY

An essential condition for the expectations placed in nanotechnology is that the possible risks and the socio-economic implications associated with them are carefully evaluated and minimized. This requires:

- the definition of a clear and shared terminology,
- an active approach to risk management,
- a possible revision of existing legislation, cooperation and coordination between the various public bodies, industry and research at national and international level,
- accurate and reliable information and dialogue with the public, reassuring and preventing the occurrence of prejudices.

The problem is particularly acute in all countries involved in the development of this sector. All major countries devote significant and growing resources to nanotechnology, in the belief that these enabling technologies are one of the “driving forces” of future technological development. Nanotechnologies have become a key growth factor and in many countries national initiatives dedicated to nanotechnology have been activated, with the objective to strengthen and streamline the objective, orienting the initiatives, bringing out the excellence and optimizing the use of human and financial available resources.

It grows the number of events in the world with the goal of compare scientists and researchers on the major issues of humanity: hunger, infant mortality, AIDS, biodiversity, renewable energy, epidemics, cancer and environment, all critical for the development of civilization.

Nanoscience marks the transition between the present and the future world, because almost all areas of our lives can become “nanoscientific”. Nanoscience is changing the way we live and will help more and more men to find solutions to cure their ills.

Nanotechnology, if properly used, can provide many opportunities for growing the world economy. Important benefits are expected to arrive in the field of diagnosis and targeted therapies, which will affect only the diseased cells. In next years the idea is to get an extraordinary nano-diagnostic, capable of detecting signals, now invisible, of diseased cells, thanks to nano-robot introduced into the body, as well as the ability to have implantable devices releasing drugs.

It has been developed nanoparticles that release insulin when glucose level in the blood increases, nano-sponge that act like real sponges, absorbing toxins or free radicals and removing them from the blood. The final goal is to have, inside the body, medicines which can be activated in time of need, for example for diabetic and cardiopathic patients, to those who risk anaphylactic shock.

Nanoforum is an important nanotechnology information network, which provides informative support to the European nanotechnology community. On Nanoforum website members of public communities, of industries, members of government and business communities can access, search for databases of nanoscience and nanotechnology organizations, find events and new informations about nanotechnology. Nanoforum publishes reports on nanotechnology, the socio-economical impact of nanotechnology, organizing events. The Nanoforum consortium consists of:

- Institute of Nanotechnology (UK) (On-line^m);
- VDI Technologiezentrum (Germany) (On-lineⁿ);
- CEA-Leti (France) (On-line^o);
- Malsch TechnoValuation (Netherlands) (On-line^p);
- METU (Turkey) (On-line^q);
- Monte Carlo Group (Bulgaria) (On-line^r);
- Unipress (Poland) (On-line^s);
- FFG (Austria) (On-line^t);
- NanoNed (Netherlands) (On-line^u; Joseph & Morrison, 2006).

CONCLUSIONS

Nanotechnology is destined to make numerous changes to the products with which consumers come daily into contact. The legislative framework must regulate nanotechnology products already in circulation on the market, very important aspects such as risk assessment and exposure, labeling and impact on health and environment. Waiting for clarification of any possible doubts on nanomaterials, the health protection and transparency in information must be the guiding principles. The results of research on nanomaterials must be made accessible to consumers and everyone involved in their regulation.

The diffusion of the nanotechnology products on markets must be carefully monitored. The product labeling facilitates the traceability of potential environmental disturbances, human exposure and adverse effects on environment and health. It is necessary that safety assessments on nanomaterials are performed by independent scientific authorities and that the products of nanotechnology on the market are safe both for the health of consumers and for the environment. Only through the parallel development of knowledge, regulation and awareness, nanotechnology will prove a success story for both the scientific-productive world and for consumers.

References

- Available^a: <https://royalsociety.org/>.
- Available^b: http://www.nsf.gov/crssprgm/nano/reports/omb_nifty50.jsp.
- Available^c: http://cordis.europa.eu/nanotechnology/src/pe_leaflets_brochures.htm.
- Available^d: <http://www.sciencemuseum.org.uk/antenna/nano/index.asp>.
- Available^e: ftp://ftp.cordis.europa.eu/pub/nanotechnology/docs/nanoarticle_hullmann_nov2006.pdf.
- Available^f: <http://www.nanotec.org.uk/finalReport.htm>.
- Available^g: ftp://ftp.cordis.europa.eu/pub/nanotechnology/docs/nanomedicine_bat_en.pdf.
- Available^h: <http://www.nanogenotox.eu/>.
- Availableⁱ: <http://nanoreg.eu/>.
- Available^l: <http://www.efsa.europa.eu/>.
- Available^m: <http://www.nano.org.uk>.
- Availableⁿ: <http://www.vditz.de/>.
- Available^o: <http://www-leti.cea.fr/uk/index-uk.htm>.
- Available^p: <http://www.malsch.demon.nl/>.
- Available^q: <http://www.physics.metu.edu.tr/>.
- Available^r: <http://cluster.phys.uni-sofia.bg:8080/>.
- Available^s: <http://www.unipress.waw.pl/>.
- Available^t: <http://www.ffg.at/>.
- Available^u: <http://www.stw.nl/nanoned/>.
- Di Sia, P. (2011). An Analytical Transport Model for Nanomaterials. *Journal of Computational and Theoretical Nanoscience*, 8, 84-89.
- Di Sia, P. (2012). An Analytical Transport Model for Nanomaterials: The Quantum Version *Journal of Computational and Theoretical Nanoscience*, 9(1), 31-34.
- Di Sia, P. (2013). *The Nanotechnologies World: Introduction, Applications and Modeling*. In: J. N. Govil (Ed). *Nanotechnology, Vol.1: Fundamentals and Applications*. Houston: Studium Press LLC.
- Di Sia^a, P. (2014). *Nano-bio-tecnologie: stato dell'arte, modellistica matematica, prospettive*. Roma: Aracne Editrice.
- Di Sia^b, P. (2014). Present and Future of Nanotechnologies: Peculiarities, Phenomenology, Theoretical Modelling, Perspectives. *Reviews in Theoretical Science*, 2(2), 146-180.
- Di Sia^c, P. (2014). Relativistic nano-transport and artificial neural networks: details by a new analytical model. *International Journal of Artificial Intelligence and Mechatronics (IJAIM)*, 3(3), 96-100.
- Di Sia^d, P. (2014). Nanobiomaterials for environmental protection: state of the art, applications and modelling. *International Journal of Engineering Innovations and Research (IJEIR)*, 3(5), 688-693.
- Joseph, T., and Morrison, M. (2006). *Nanotechnology in Agriculture and Food, A Nanoforum report*. [On-line]. Available: www.nanoforum.org.
- Szkal, C., Roberts, S. M., Westerhoff, P., Bartholomaeus, A., Buck, N., Illuminato, I., Canady, R., and Rogers, M. (2014). Measurement of Nanomaterials in Foods: Integrative Consideration of Challenges and Future Prospects. *ACSNano*, 8(4), 3128-3135.

Pre-Service Science Teachers' Perceptions Of Technology Literacy

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ABSTRACT

Science literacy contains understanding technology. Therefore, it raises questions about the role of technology in science education. The aim of the study is to investigate pre-service science teachers' perceptions of technology literacy. Phenomenography served as the methodological framework for the study to gain in-depth insight about the nature of technology literacy in science education. The pre-service teachers discussed about the concepts associated with the key components of knowing, learning, and thinking within technology's everyday experiences, during the interviews. The responses of the pre-service teachers to the questions in the interviews were evaluated and according to this evaluation it was determined that their perception of technology literacy was separated into categories. The findings are expected to provide a basis for discussion about using technology literacy to foster future teachers' instructional efficiency.

Keywords: Pre-service science teachers; science education; technology literacy; phenomenology

INTRODUCTION

Technology affects dramatically our lives, so their growth in education for instructional use has increased (Spotts, 1999). There is much discussion about the integration of technology into education from all disciplines (Georgina & Olson, 2008).

When considered in terms of education, the use of new instructional technologies is multidimensional. It includes the possible use of new or revised materials, teaching approaches and the possible alteration of beliefs (Fullan, 1991). The primary task of technology in education is to support both instructional technology and student learning technology. This includes technology to enhance and support communication between student and instructors (Georgina & Olson, 2008).

Today's information and communication technologies can be addressed to science education as an alternative teaching way. Furthermore, science and technology is a compulsory subject between the grade 4 and 8 in the Turkish Educational System and the education system is expected to produce technologically literate students (Turkish Ministry of National Education, 2005). Therefore it is important to use and understand technology. Russell, Bebell, O'Dwyer, and O'Connor (2003) have stated the quality and availability of educational technology in schools have increased significantly along with the technological literacy of teachers and students.

Schrum (1999) reported bulleting points relating to teacher technology training: it takes considerably longer to learn about technology for personal or pedagogical use than learning a new teaching model; access to the new technology at school and at home is essential; fear of the unknown must be addressed; the use of new technology may require teachers to reconceptualize the ways in which they teach. Therefore, it is important that pre-service teachers to be technology literate.

Technology and literacy were found to be the subjects of ongoing debate in several fields of study (Lewis & Gagel, 1992). Technological literacy means that an individual should have the capacity to "design, develop, control, use and assess technological systems and processes" (Shackelford, Brown & Warner, 2004, p. 7). Davies (2011) has stated that understanding technological literacy involves three levels: (1) awareness, (2) praxis (i.e., training), and (3) phronesis (i.e., practical competence and practical wisdom). Hansen (2003) has indicated that technology literacy as an individual's abilities to adopt, adapt, invent, and evaluate technology to positively affect our life, community, and environment. Eisenberg and Johnson (2002) stated that a technologically literate person can use technology as a tool for organization, communication, research, and problem solving.

It is important to critically analyze technology literacy and how we evaluate successful integration of technology into instructional situations. Therefore, ideas in the minds of teacher candidates about technology literacy have been studied in depth with phenomenographic approach. The aim of the phenomenographic research is to see the

world from the point of view of learners (Ashworth & Lucas, 1998). The phenomenographic method, the first contribution to education; is related to the student's learning and defines the diversity of experience in the training process, the second contribution; identifies the qualitative diversity of the student's understanding of the basic issues (Trigwell, 2006). Phenomenological themes may be understood as the structures of experience (Van Manen, 1990).

At this point, in this research, the matter of emphasis seemed to center on technology and literacy. If educators know the views of students' minds, they can arrange the technology learning environments. This study's aim was to determine students' deeper understanding of technological literacy. There is a limited number of studies using qualitative methods to explore students' perceptions of technology literacy (e.g., Davies, 2011; Gagel, 1997). Results of the study provide in-depth information about pre-service science teachers' views about the implementation of technology in science class.

Teachers should be eager for using technology and evaluating appropriate technology integration first in terms of why we are using the technology, then how well the technology was used to accomplish the learning task. An important part of the instructional technology discipline will always include developing new ways to use technology in educational situations. Training technology users will always include becoming aware of and providing practice with new technology (Davies, 2011). Therefore, to investigate teacher candidates' views on the use of technology may ensure their potentials of integration of education.

Though the data is from a limited population, it helps describe what their thinking. Another possible limitation is in the data collection process. The data was only collected through interviews. Observations of the teachers in their classrooms could be helpful to verify the information they provided during face to face interviews. It was hoped this would provide information beneficial for pre-service science teachers encouraging greater use of technology in science education.

This study was designed to answer the following two main research questions:

1. What are the pre-service science teachers' conceptions about technology and technology literacy?
2. How do the pre-service science teachers' self-perceptions of technology literacy in educational practice?

THE STUDY

The qualitative research method used in this study. The purpose of this qualitative phenomenological study was to explore pre-service science teachers' ideas and perceptions of technology literacy. Quantitative research is generally based on determining, predicting, or testing specific causal relationships based on certain variables, (Creswell, 2005). Ethnography, case study, grounded research theory, narrative, and phenomenology are examples that are more commonly used (Creswell, 2005). This type of qualitative inquiry, phenomenology, was selected for this study because the purpose of this research was to understand a particular phenomena, that is, the perceptions of technology literacy of pre-service science teachers. This approach focuses on exploring lived experienced of participants with rich descriptions from the perspectives of the participants who experience the phenomenon. According to Marton and Booth (1997) with the phenomenographic approach people how they understand certain situations and issues, how they understand, how they make sense and how they interpret are analyzed. Phenomenological research uses rich and distinct descriptions of students' perceptions for insight and understanding about the phenomenon (Moustakas, 1994, p. 101).

Sampling in a phenomenographic study aims that capturing the dimension of variation in perspectives (Bruce et al., 2004). Therefore, the participants of this study were selected purposefully to capture the variations on the nature and use of thought experiments. In purposeful sampling the goal is to select cases that are likely to be information rich with respect to the purpose of the study (Gall, Gall & Borg, 2003, p.165). The participants for this study consisted of pre-service science teachers who had experience with computer instruction from different perspectives, and who volunteer to participate in this study. The sample consisted of 10 pre-service science teachers which took computer courses. Of these participants, five were female and five were male. The research was conducted in Faculty of Education in the spring semester of the 2014-2015 academic year.

Data collection methods of phenomenological research include in-depth interviews, observations, and documents. The most common interview type used in phenomenology and fundamental to many qualitative researches is the semi-structured interviews (Creswell, 2007). In this study, the semi-structured interviews were carried out in order to examine further thoughts of the participants. The answers received were recorded by the researcher by taking written notes. Each participant's interview lasted for approximately 30 min.

In the analysis of data with phenomenographic approach, interviews recorded with the sound recorder first. In this

method these records are transcribed as full compliance with the original discussions. The data written in the paper are divided into proper categories. Researchers using this method should establish clearly categories (Marton, 1994). In this study data were analyzed using Giorgi's (1997) method of descriptive phenomenology under four stages: data coding, developing themes, organizing codes and themes, and describing findings, stated by Yildirim and Simsek (2008). The researchers looked at and listened to the recorded responses of the participants and discussed them. The transcripts were examined by different researchers and this multiple examinations contributed to the trustworthiness of the analysis. Findings are presented in the next section.

FINDINGS

To find out students' perceptions of technology literacy, the responses of students obtained from interviews were analyzed in detail and can be seen underneath the related theme. The interviews focus on the technology literacy is divided into basic headers. Responses were categorized around five thematic topics: (1) definition of technology, (2) definition of technology literacy, (3) features of technology literate individuals, (4) importance of technology literacy, (5) the implementation of technology literacy in science education. Results of this study were presented under these categories. Themes, codes and categories are presented in tables. Short quotations from students' responses have been given as an example.

The term technology is a component of the technology literacy, therefore the interviews started with this question: "What is technology?". The students' views of technology are presented in Table 1.

Table 1: Students' definitions of technology

Theme	Categories	Codes	Examples of Definitions
Technology	Software	Programs	"It is a set of programs that facilitate human life."
		Applications	"It is a communication tool that enables communication with the help of applications."
	Hardware	Device	"They are devices that make life easier."
		Computer System	"Technology is the name given to the totality of machines called computers."
	Improvement	Invention	"They are inventions that help the innovations in the world."
		Innovation	"I think that technology innovations are made to make life easier"
	Knowledge	Science	"It called technology that innovation associated with science."
		Information	"Developments that can be carried out with the knowledge."

The categories were obtained from definitions of the students are given in Table 1. Referring to Table 1 it was seen that the technology was not fully defined by the teachers' candidates. They had partial understanding this concept. Although definitions were correct, no participants had the full correct response. They generally believed that technology was the same thing with the computer. They gave lacking answers.

They were asked how they define technology literacy during the interviews. Definitions of students about technology literacy are given in Table 2.

Table 2: Students' definitions of technology literacy

Theme	Categories	Codes	Examples of Definitions
Technology literacy	Producing technological devices	Inventing	"Technology literacy is to make technological tools."
		Striking out	"Technology literacy is to make scientific discoveries using technology."
	Producing software	Writing programs	"Technology literacy is to be able to write computer programs and applications."
	Using technology usefully	Following developments	"Technology literacy is to keep track of technological developments."
		Learning developments	"Technology literacy is the use of technology to learn what's new."
	Being expert	Installing and repairing	"Technology literacy is to be successful in the installation and repair of technological tools."

As seen the Table 2 none of the participants could identify this concept correctly. Some of the students thought that technology literacy was to repair technological devices. Some of them put forward that technology literacy

was writing programs. Also some participants said that this term meant following the developments. They gave partial correct answers.

To provide deeper understanding of technological literacy, students were asked to technology literate individuals' features. This theme is given in Table 3.

Table 3: Students' responses about features of technology literate individuals

Theme	Categories	Codes	Examples of Descriptions
Features of technology literate individuals	Profession	User	"They should use the newly developed programs."
	Curious and progressive	Curious	"A person who investigated knowledge on the internet from many sources and websites."
		Progressive	"It is a person eligible for innovation and development."
		Follower	"It is person who follows the science and technology magazine and journals."
	Demonstrating products	Productive	"These people should have research that has been improved science and industry domain."

Responses of the students were correct, but not complete. The technology literate person should be curious, progressive, productive etc. but he/she does not have to be professional.

Considering the scope of science education, students were asked to importance of technology literacy and implementation of technology literacy during the interviews. Table 4 and Table 5 indicated participants' interpretations. Their views were divided into two categories: positive and negative, because responses focused similar views codes were not given for these themes. Examples of interpretations also are given in these tables (4 and 5).

Table 4: Students' interpretations about importance of technology literacy

Theme	Categories	Examples of Interpretations
Importance of technology literacy	Positive opinions about importance of technology literacy	"Technology literacy teacher can prepare slides and can teach lessons in this way in class."
		"To be a technology literate person provides easy access to the information. It is necessary to keep pace with the evolving world."
		"Science education and technology related. Therefore, it is important technology for science education."
		"To be a technology literate person benefits to follow innovations and developments."
	Negative opinions about importance of technology literacy	"I am not technology literate person because I am not writing a computer program. I think it is not very important element for a teacher."
		"I do not understand the technology. When I have a problem with my computer, I take it and go to service. If I were computer literate person I could do it myself. But it is not important thing for a teacher."

Pre-service science teachers' interpretations about the implementation of technology literacy in science education are given in Table 5.

Table 5: Students' interpretations about the implementation of technology literacy in science education

Theme	Categories	Examples of Interpretations
The implementation of technology literacy in science education	Positive opinions about the implementation of technology literacy in science education	<p>"Instructions by using smart boards and projection, teachers is important for science education."</p> <p>"Everyone who use the computer is technology literate person. At the same time, Teacher who use the computer in the class is the technology literate person."</p> <p>"The technology used during science experiments."</p> <p>"Meaningful learning can be accomplished by making the instructions with the videos."</p> <p>"When the technological tools used in the experiment break down, technology literacy teachers can easily solve this situation."</p>
	Negative opinions about the implementation of technology literacy in science education	<p>"Because the use of technology in science lessons would be a waste of time, technology literacy may not important to this course."</p>

As seen these tables some of the participants thought that technology literate teachers was important for science class environment, but others thought that technology literacy was not a necessary thing. Teachers who had negative ideas were participants who did not identify the concept of technology literacy correctly.

CONCLUSIONS

The research question focused on how pre-service science teachers defined technology literacy, for which purposes they used technology, what they thought about the importance of technology literacy in science class, and which guidelines they suggested for classroom practice. This study employed a qualitative design to gain an in-depth understanding about the nature of technological literacy in science education. Data was collected through in-depth interviews with pre-service science teachers.

Pre-service science teachers defined technology as software, hardware, improvement, knowledge. Although their definitions were correct, none of the participants responded fully accurate. Another theme was technology literacy and it was answered inadequately or incorrectly. Participants had wrong views about technology literacy and technology literate people. Technology literate people know what the technology is capable of, they are able to use the technology proficiently, and they use technology effectively (Davies, 2011). One of the findings was that pre-service science teachers generally emphasized that technology literate person could write programs, they could repair technological devices.

Considering the scope of science education, during the interviews students were asked to importance of technology literacy and implementation of technology literacy. Their views were divided into positive and negative categories. Some of the participants thought that technology literate teachers were important for science class environment, but others thought that technology literacy was not necessary thing. Teachers who had negative ideas were participants who did not correctly identify the concept of technology literacy. Some of them uttered that technology literacy was effective in science education and technology should use in lessons.

When the results of the study were examined as to the understanding of technology in education, it was seen that the pre-service science teachers were not fully aware of the meaning of literacy. Some of technology literacy themes, which founded this study, were similar to Gagel's (1997) research. In curriculum design, the themes can serve as conceptual guides in the formulation of decision rules for the choosing of competencies and educational strategies. In addition, these themes answer the purpose to establish a universe of discourse in which a rational discussion of technological literacy can proceed (Gagel, 1997).

The interesting finding was some of the pre-service science teachers considered that using technology did not contribute to learning environment. This view about technological literacy revealed that pre-service teachers should be informed about educational technology. Learning environments should be designed to help future teachers understand, evaluate, and promote effective technology integration.

If educators know the views of students' minds, they can arrange the technology learning environments. Therefore, this study is expected to contribute to the training pre-service science teachers as a technology literate people.

While people maintain to use technology, what it takes to be considered technologically literate will change. Technological literacy, like its functional agent technology, is an everchanging phenomenon. However, technology is defined today, we can be certain that by future it will have changed (Gagel, 1997). Under light of the research, it can be said that an ability to read and write in a technical language with proficiency should be an obvious goal for a curriculum claiming to advance technological literacy.

References

- Ashworth, P., & Lucas, U. (1998). What is the 'world' of phenomenography?. *Scandinavian Journal of Educational Research*, 42(4), 415-431.
- Bruce, C., Buckingham, L., Hynd, J., McMahon, C., Roggenkamp, M., & Stoodley, I. (2004). Ways of experiencing the act of learning to program: A phenomenographic study of introductory programming students at university. *Journal of Information Technology Education*, 3, 143-160.
- Creswell, J. W. (2005). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research (2nd Ed.)*. Upper Saddle River, NJ: Pearson.
- Creswell, J.W. (2007). *Qualitative Inquiry and Research Design: Choosing among Five Approaches (2nd Ed.)*. Thousand Oaks, CA: Sage Publishers.
- Davies, R. S. (2011). Understanding technology literacy: A framework for evaluating educational technology integration. *TechTrends*, 55(5), 45-52.
- Eisenberg, M.B., & Johnson, D. (2002) Learning and teaching information technology: Computer skills in context. ERIC Document Reproduction No. ED 465 377.
- Fullan, M.G. (1991). *The New Meaning of Educational Change (2nd ed.)*, New York: The Teachers College Press.
- Gagel, C. W. (1997). Literacy and technology: Reflections and insights for technological literacy. *Digital Library and Archives*, 34(3), 1-14.
- Gall, M.D., Gall, J.P. & Borg, W.R. (2003). *Educational Research*. Boston: Ally and Bacon.
- Georgina, D. A., & Olson, M. R. (2008). Integration of technology in higher education: A review of faculty self-perceptions. *The Internet and Higher Education*, 11(1), 1-8.
- Hansen, J. W. (2003) To change perceptions of technology programs. *Journal of Technology Studies*, 29, 16-19.
- Lewis, T., & Gagel, C. (1992). Technological literacy: A critical analysis. *Journal of Curriculum Studies*, 24(2), 117-138.
- Marton, F. & Booth, S. (1997). *Learning and Awareness*. Mahwah, N.J.: Lawrence Erlbaum.
- Marton, F. (1994). Phenomenography. In T. Husen & N. Posthletwaite. *The International Encyclopedia of Education*. New York: Pergamon.
- Moustakas, C. (1994). *Phenomenological Research Methods*. Sage Publications.
- Russell, M., Bebell, D., O'Dwyer, L., & O'Connor, K. (2003). Examining teacher technology use: Implications for preservice and inservice teacher preparation. *Journal of Teacher Education*, 54(4), 297-310.
- Schrum, L. (1999). Technology professional development for teachers. *Educational Technology Research & Development*, 47(4), 83-90.
- Shackelford, R. L., Brown, R., & Warner, S. A. (2004). Using concepts and theoretical models to support the standards for technological literacy. *Technology Teacher*, 63(5), 7-22.
- Spotts, T. H. (1999). Discriminating factors in faculty use of instructional technology in higher education. *Educational Technology & Society*, 2(4), 92-99.
- Trigwell, K. (2006). Phenomenography: An approach to research into geography education. *Journal of Geography in Higher Education*, 30(2), 367-372.
- Turkish Ministry of National Education Curriculum (2005). Ankara: Access date: 10.03.2015. <http://ttkb.meb.gov.tr/program2.aspx>
- Van Manen, M. (1990). *Researching lived experiences*. State University of New York Press, Albany.
- Yıldırım, A., Simsek, H. (2005). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. Ankara: Seçkin Yayıncılık.

Prospective Chemistry And Science Teachers' Metaphoric Perceptions Of Science

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ABSTRACT

The aim of this study is to determine freshmen and senior prospective teachers' views of science by using their metaphors. Case study as a qualitative research design was benefited in the research. 145 prospective chemistry and science teachers from a university in İstanbul were participated in the study. Participants were asked to complete some sentences about science (science is like...;because...). The meaning of metaphor was briefly explained in order to guide the participants to construct relevant metaphors. The data of the study was analyzed with content analysis. It was found that prospective teachers constructed 69 different metaphors under 9 categories including "science is open to change", "science is infinite", "science combines different areas of studies together", "science enlightens/guides people". Among these, the most commonly constructed metaphors were sun (n=11), tree (n=11), light (n=10), ocean (n=7), space (n=7) and book (n=6). The findings of the study showed that most of the participants considered science as a tentative and infinite way. Some conclusions were discussed in the light of the findings.

INTRODUCTION

Science has a vital role in our lives. We search answers to questions of the natural world with the help of scientific studies. Our knowledge of health, transportation, agriculture, technology, education and industry depends heavily on scientific research. Science is a way of knowing and thinking as well as it guides people to understand the universe and social structures (Lederman, 1992). According to the Turkish National Ministry of Education, science is an area that everyone can participate in and make contribution to (MNE, 2007). Even though science addresses all people who are interested in it, there are a lot of different definitions of science in minds and these include misconceptions and myths (McComas, 1998; Abd-El Khalick, 2004). Determining and reducing these misconceptions will help to improve citizens' images of science. In this manner, science education programs and teachers play a key role in this process, as they are mostly responsible for educating people.

The aim of Turkish science teaching programs is to raise scientifically literate students (MNE; 2013). Scientific literacy is defined as "the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity" (NRC, 1996, p. 22). Citizens who understand the characteristics of science will be able to distinguish pseudo-scientific claims from scientific research and use scientific knowledge in everyday life decision-making processes (Bell & Lederman, 2003). When the number of scientifically literate citizens increases, it is considered that society will have positive views towards science (Driver, Leach, Millar & Scott, 1996). Therefore, it is important to find out what prospective teachers think about science, as they will be mostly responsible for educating students in future. At this point, metaphors play an important part revealing prospective teachers' ideas of science. Thinking with metaphors is an important part of scientific process. Metaphor is defined as "a novel or poetic linguistic expression where one or more words for a concept are used outside of its normal conventional meaning to express a similar concept" (Lakoff, 1993, p. 202). Metaphors help understand and explain concepts as well as they relate solid facts and abstract ideas (Gültekin, 2013). Therefore, metaphors make complex ideas and concepts more understandable (Yıldırım & Şimşek, 2013).

The aim of the study is to find out freshmen and senior prospective teachers' metaphors that they constructed for the concept of "science". The research questions of the study are;

- 1- What metaphors do prospective chemistry teachers (PCT) and prospective science teachers (PST) construct to define science?
- 2- Which categories can these metaphors be classified in?

THE STUDY

The study was constructed in the light of constructivist/interpretive paradigm. Prospective teachers' metaphors of science and their explanations were deeply analyzed in a qualitative way. For this purpose, case study as a qualitative design was benefited. According to Yin (2003, p. 13), case study "investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident".

The participants of the study are freshmen and senior prospective chemistry and science teachers from a university in İstanbul. 120 female (83%) and 25 male (17%) students participated in the study voluntarily (Table 1).

Table 1. The distribution of the participants according to their majors and grades

Participants			Female	Male	Total
Freshmen	Prospective	Chemistry	14	2	16
Teachers					
Senior Prospective Chemistry Teachers			18	8	26
Freshmen Prospective Science Teachers			43	8	51
Senior Prospective Science Teachers			45	7	52
Total Number			120	25	145

The participants were asked to complete some sentences about science (science is like...;because...). For this purpose, a questionnaire consisting of these open-ended questions were designed. Before administering the questionnaire, the meaning of metaphor was briefly explained in order to guide the participants to construct relevant metaphors. They were asked to write only one metaphor to explain their ideas about science.

The data were analyzed by content analysis technique. The main aim of the content analysis is to reach some relationships that will explain the research data. For this purpose, similar data are brought together within some main concepts, and then they are organized. Finally, themes are constructed to explain data (Yıldırım & Şimşek, 2005). Data were analyzed in five stages according to Saban (2008). In the **coding and elimination stage**, metaphorical images were coded (tree, light, child, etc.). The answers in which metaphors were not clearly constructed were eliminated. In this stage, 8 answers were eliminated. In the **classification stage**, metaphors (n=69) were examined to find similarities with other metaphors. In the **categorization stage**, each metaphor was analyzed in terms of similar characteristics that were related to the *science* concept. 9 different conceptual categories were defined after this inductive analysis procedure. In the **establishing inter-rater reliability stage**, an expert from science education department analyzed the data independently from the researchers. The level of agreement between the expert and the researcher was 92%. According to Miles & Huberman (1994), the analysis is considered to be reliable when there is 80% or over coherence between two codings. In the **last stage**, all of the data were transferred into computer and percentages and frequencies were calculated for each category.

FINDINGS

Participants' metaphors were presented in Table 2. Findings have shown that the participants constructed 69 metaphors. Among these metaphors, the most commonly constructed ones are sun (n=11, 7,59%), tree (n=11, 7,59%), light (n=10; 6,90%), ocean (n=7; 4,82%), space (n=7; 4,82%) and book (n=6; 4,14%).

Table 2. Frequencies and percentages of participants' metaphors for the concept of "science"

Metaphor	Freshmen PC	Senior PCT	Freshmen PS	Senior PST	Frequency (f)	Percentage (%)
Human brain	1	-	-	1	2	1,38%
Locked door	1	-	-	-	1	0,69%
Time	1	-	-	-	1	0,69%
Rocks	1	-	-	-	1	0,69%
Flower seed	1	-	1	-	2	1,38%
Baby tiger	1	-	-	-	1	0,69%
Ocean	1	-	2	4	7	4,82%
Drug	1	-	-	-	1	0,69%
Child	1	1	1	2	5	3,45%
Excavation	1	-	-	-	1	0,69%
Factory	1	-	-	1	2	1,38%
Hope	1	-	-	-	1	0,69%
Baby	1	-	3	-	4	2,76%
Mother	1	-	-	-	1	0,69%
Weapon	1	-	-	-	1	0,69%
Tree	1	3	1	6	11	7,59%
Death	-	1	-	-	1	0,69%
Book	-	2	4	-	6	4,14%
Comma	-	1	-	-	1	0,69%
Space	-	2	4	1	7	4,82%
Human	-	2	1	-	3	2,07%
Kinder surprise	-	1	-	-	1	0,69%
Google	-	1	-	-	1	0,69%

Cocktail	-	1	-	-	1	0,69%
Destructive for	-	1	-	-	1	0,69%
Pomegranate	-	1	-	-	1	0,69%
Fruit salad	-	1	-	1	2	1,38%
Woman	-	1	-	-	1	0,69%
Fashion	-	1	1	1	3	2,07%
Cat	-	1	-	-	1	0,69%
Bag	-	1	-	-	1	0,69%
Black hole	-	1	-	-	1	0,69%
Water	-	1	-	-	1	0,69%
Adventure	-	1	-	-	1	0,69%
Sun	-	1	8	2	11	7,59%
Puzzle	-	-	1	-	1	0,69%
Limitless	-	-	1	1	2	1,38%
Door	-	-	1	-	1	0,69%
Light	-	-	3	7	10	6,90%
Star	-	-	1	-	1	0,69%
Horizon	-	-	1	-	1	0,69%
Nutrition	-	-	1	-	1	0,69%
Path	-	-	2	-	2	1,38%
Plant	-	-	1	-	1	0,69%
Snowball	-	-	1	-	1	0,69%
Tourist guide	-	-	1	-	1	0,69%
House	-	-	1	2	3	2,07%
Earth	-	-	2	1	3	2,07%
Library	-	-	3	-	3	2,07%
Sky	-	-	3	-	3	2,07%
Universe	-	-	1	3	4	2,76%
Tornado	-	-	1	-	1	0,69%
Culture	-	-	-	1	1	0,69%
Human life	-	-	-	1	1	0,69%
Endless well	-	-	-	1	1	0,69%
Ladder	-	-	-	3	3	2,07%
Fish	-	-	-	1	1	0,69%
Pet	-	-	-	1	1	0,69%
Medicine	-	-	-	1	1	0,69%
Pen	-	-	-	1	1	0,69%
2 standing mirrc	-	-	-	1	1	0,69%
Mountain	-	-	-	1	1	0,69%
Diamond	-	-	-	1	1	0,69%
Lighthouse	-	-	-	1	1	0,69%
Domino	-	-	-	1	1	0,69%
Gold mine	-	-	-	1	1	0,69%
Nefron	-	-	-	1	1	0,69%
Past and prese	-	-	-	1	1	0,69%
Istanbul	-	-	-	1	1	0,69%
Total	16	26	51	52	145	100%

The findings have shown that the participants constructed these metaphors under 9 different categories as it can be seen in Table 3.

Table 3. Frequencies and percentages of metaphorical categories for the concept of “science”

Categories	Freshmen PCT	Senior PCT	Freshmen PST	Senior PST	F	%
Science is infinite	2	8	14	6	30	21%
Science is open to change	2	4	13	9	28	19%
Science enlightens/guides/helps people	1	2	13	11	27	18%
Science is open to inquiry/research	2	1	7	6	16	11%
Science combines different areas of study together	1	5	2	6	14	10%
Science requires effort and practice	2	3	2	6	13	9%
Science involves/produces (new) knowledge	2	3	0	6	11	8%
Science is based on solid ground	1	0	0	2	3	2%
Science has both negative and positive effects/sides	3	0	0	0	3	2%
Total	16	26	51	52	145	100%

The results have shown that most of the participants (n=30; 21%) think science is infinite and open to change (n=28; 19%). Some metaphors and explanations in these categories are presented below:

“Science is like time because it never ends. It always keeps on progressing.” (Freshmen PCT, 3)
“Time is like comma. Because scientific researches always continue. Science always keeps on going forward.” (Senior PCT, 3)
“Science is like horizon because people always try to go beyond their dreams and ideas. They make explanations, then new ideas are added and it keeps on going like that” (Freshmen PST, 15)
“Science is like a child because a child’s likes and dislikes change with the developmental stage. Science looks like this. Scientific theories change with new evidence or reinterpreting the existing knowledge” (Senior PST, 10)

Also, the majority of them believe science enlightens, guides or helps people (n=27; 18%). Some of the participants underline that science combines different disciplines of inquiry together (n=14; 10%). Some examples for these categories are presented below:

“Science is like sun. Because it enlightens everything around it and it is necessary for life. Science, like sun, guides people and make their lives better.” (Senior PCT, 24)
“Science is like a house because, a house consists of rooms such as kitchen, bathroom, living room. Science has branches and they look like rooms. Chemistry is like kitchen.” (Senior PST, 28)

16 participants (11%) underline that science is open to inquiry and research and 13 of them (9%) believe that science requires effort and practice. Also, some of the participants (n=11, 8%) think science involves/produces (new) knowledge.

“Science is like a child, because it always asks questions and tries to find answers to these questions. Like a curious child, science seeks answers to the unknown.” (Freshmen PCT, 10)
“Science is like tree because in the first place, it takes patience and effort for a long time. After that, scientific knowledge develops.” (Senior PCT, 27)
“Science is like factory because it produces new knowledge all the time.” (Senior PST, 12)

In Table 4, there are categories for the concept of “science” and some examples from metaphors that the participants have constructed.

Table 4. Metaphorical categories for the concept of “science” and some examples of them

Categories	Metaphors
Science is infinite	-Time, ocean (Freshmen PCT) -Death, comma, space, book, black hole, child (Senior PCT) -Limitless, puzzle, snowball, space, horizon, ocean, earth, sky, universe, path, book, library (Freshmen PST) -Human brain, Endless well, sun, two mirrors facing each other, limitless, space, universe (Senior PST)
Science requires effort	-Mother; flower seed (Freshmen PCT) -Tree, adventure (Senior PCT) -Tree, plant (Freshmen PST) -Culture, pet, child, earth, fish (Senior PST)
Science is open to change	-Human brain, baby (Freshmen PCT) -Human, woman, fashion, cat (Senior PCT) -Baby, human, space, seed, book, child, fashion, earth (Freshmen PST) -Fashion, Istanbul, limitless, universe, tree (Senior PST)
Science combines different areas of studies together	-Tree (Freshmen PCT) -Human, fruit salad, book, cocktail, tree (Senior PCT) -House, library (Freshmen PST) -House, tree, ocean (Senior PST)
Science enlightens/guides or helps people	-Hope (Freshmen PCT) -Sun, water (Senior PCT) -Light, sun, tourist guide, star, nutrition (Freshmen PST) - sun, light, lighthouse (Senior PST)
Science is based on solid ground	-Rocks (Freshmen PCT) -Ladder (Senior PST)
Science involves/ produces (new) knowledge	-Factory, unlocked door (Freshmen PCT) -Kinder surprise, Pomegranate, Google (Senior PCT) -Ocean, universe, factory, tree (Senior PST)
Science is open to inquiry/research	-Excavation, child (Freshmen PCT) -Bag (Senior PCT) -Ocean, book, human, space, sun (Freshmen PST) -Nefron, gold mine (Senior PST)
Science has both negative and positive effects/sides	Weapon, baby tiger, drug (Freshmen PCT)

CONCLUSIONS

Developing people’s images of science is a key goal of science education. Especially teachers have an important role, for they are mostly responsible for educating students. Science educators and science education programmes need to focus on misconceptions about science as the programme’s major aim is scientific literacy. Using metaphors is effective for the reflection of students’ ideas for various topics. Also, metaphors will enhance students’ language skills as well as creativity. In the study, prospective teachers constructed 69 different metaphors under 9 categories. Most of the prospective teachers mention that science is infinite (it never ends) and it is open to change. Their explanations show that they put emphasis on nature of science tenets such as the tentative nature of science. Also, most of the participants view science as a guide. They appreciate the necessity of science for human life. From this point of view, it is possible to say that most of the prospective teachers have contemporary views of science because their explanations are consistent with the science description given by Lederman (1992). Besides these, prospective teachers use both the living (human, animal, plant etc) and inanimate objects (book, light, house) as metaphors. Metaphors can be used as an alternative method when determining both students and teachers’ ideas about science or any other concept (including nature of science tenets like theory, law, scientist etc).

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References

- Abd-El-Khalick, F. (2004). Over and over again: College students' views of nature of science. In L.B. Flick ve N. G. Lederman (Eds.), *Scientific inquiry and nature of science: Implications for teaching, learning, and teacher education* (pp. 389–425). Dordrecht: Kluwer.
- Bell, R. L., & Lederman, N. G. (2003). Understandings of the nature of science and decision making on science and technology based issues. *Science education*, 87(3), 352-377.
- Driver, R., Leach, J., Millar, R., & Scott, P. (1996). *Young people's images of science*. Buckingham: Open University Press.
- Gültekin, M. (2013). The metaphors that primary education teacher candidates use regarding curriculum. *Education and science*, 38 (169), 126-141.
- Lakoff, G. (1993). The contemporary theory of metaphor. *Metaphor and thought*, 2, 202-251.
- Lederman, N. G. (1992). Students' and teachers' conceptions of the nature of science: A review of the research. *Journal of research in science teaching*, 29(4), 331-359.
- McComas, W. F. (1998). The principal elements of the nature of science: Dispelling the myths. In W. F. McComas (Ed.), *The nature of science in science education: Rationales and strategies* (pp. 53-70). Dordrecht: Kluwer Academic Publishers.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis* (2nd Edition). Thousand Oaks: Sage Publications.
- Ministry of National Education (MNE). (2007). *Chemistry Education Program for 9. Grades*. Ankara: MEB Publication.
- Ministry of National Education (MNE). (2013). *Chemistry Education Program for Secondary Grades (9., 10., 11 & 12. Grades)*. Ankara: MEB Publication.
- National Research Council (NRC). (1996). *National science education standards*. Washington, DC: National Academies.
- Saban, A. (2008). Metaphors about school. *Educational administration: Theory and practice*, 55, 459-496.
- Yıldırım, A., & Şimşek, H. (2005). *Sosyal bilimlerde nitel araştırma yöntemleri* (5. Baskı). Ankara: Seçkin.
- Yıldırım, A., & Şimşek, H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri* (9. Baskı). Ankara: Seçkin.
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd edition). Thousand Oaks, CA: Sage.

Prospective Teachers' Perceptions On Interdisciplinary Instruction And Integration Between History And Geography Lessons

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ABSTRACT

Geography and history are complementary and interdependent subject areas. Geographical factors are indispensable for illuminating and understanding historical facts and historical factors are crucial for comprehending geographical facts in the strict sense. This interrelatedness might be beneficial to build cross-curricular lines for interdisciplinary instruction as one of the key concepts of effective teaching. But in practice they are usually taught in isolation. In this situation perception of teachers is a significant factor. The aim of this study is to elicit the knowledge and perceptions of prospective history and geography teachers who are on the threshold of the profession about the integration of these two subject areas. For this purpose opinions of 40 senior prospective history and 36 senior prospective geography teachers were taken. Open ended questions were asked them in data collection tool. Answers were analyzed according to descriptive analysis technique. As a result majority of the prospective teachers similarly described the concept as interactive instruction between disciplines, took a bright view and found this integration useful. Despite majority of them perceived themselves as efficient in integrating two disciplines, the rate of negative opinions in this regard was quite a lot. According to these results some suggestions were given.

Keywords: Interdisciplinary instruction, integration between history and geography, prospective teachers' perceptions

INTRODUCTION

Interdisciplinary study as one of the key components of effective teaching in today's educational understanding is defined as *"a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession . . . draws on disciplinary perspectives and integrates their insights through construction of a more comprehensive perspective"* (Newell, 2007) and interdisciplinary understanding is *"the capacity to integrate knowledge and modes of thinking drawn from two or more disciplines to produce a cognitive advancement-for example, explaining a phenomenon, solving a problem, creating a product, or raising a new question-in ways that would have been unlikely through single disciplinary means"* (Mansilla, 2005). Foundation of interdisciplinary instruction is based on the educational movements in early 21st century (Vars, 1991; Akins & Akerson, 2002; Applebee et al., 2007). Since then lots of supportive researches had been produced, besides the challenging ones as well.

Today in the curriculum reforms interdisciplinary instruction is offered and educational organizations frequently promote this in various levels of instruction in US and Europe (Akins&Akerson, 2002; Fidalgo-Neto et al., 2014; Krishnan, 2009). There are some justified reasons put forward by researches. One of them is the ineffectual outcomes of traditional disciplinary approaches. The other and mostly referred one is the relevancy of interdisciplinary teaching in 21st century's educational needs and approaches. The other is the benefits of interdisciplinary teaching for students, teachers and learning environments.

Increasingly global society of the 21st century creates socially interdependent and complex human relations. Traditional disciplinary studies are not sufficient to comprehend and teaching various dimensions of this global world (Lee, 2007; Marzano, 1991; Newell, 2007). Newell (2007) who shows the interdisciplinarity as *"the only game in town for understanding and addressing this complexity"*, had stated the various advantages of this in complete form (Newell, 1994). Then in many studies the researchers set potentials and the educational outcomes of interdisciplinary instruction. Interdisciplinary instruction provides students to develop critical thinking skills, creativity (Duerr, 2008), deeper knowledge about disciplines, higher success rate, level of interest and active learning environment (Akins & Akerson, 2002). This kind of an instruction relates students' knowledge to their everyday lives supports participatory, dynamic and stimulating learning environment between teachers and students and enables them to develop inter-cultural perspectives, outlook of cultural sensitivity and global interdependence (Lee, 2007). At the same time interdisciplinary instruction was challenging because it is time consuming, difficult to plan, dependent on the skills and perceptions of teachers, easy to be confused and overlap in terms of disciplines (Adler & Flihan, 1997; Duerr, 2008; Jones, 2009).

Instruction of various disciplines in integration might be possible through interdisciplinary approach. History and geography courses are convenient for this because of the interdependent natures of these two disciplines. Just in 1988, Bradley Commission report included history and geography relationship among the priorities of history

courses, suggested curricular patterns for this. Courses were offered to be designed including human interaction with environment (Bradley Commission on History in Schools, 1988). Then, in History- Social Science Curriculum Framework for California Public Schools (2005) geography and history was shown as two great integrative studies of the field and the importance of the variables of time and place, when and where, history and geography were stressed repeatedly throughout this curriculum. Boehm, Saxe, Rutherford (2003) developed a history curriculum framework that offers teachers the opportunity to teach traditional U.S. history course enriched by a consistent injection of the geographical aspects. They think that geography and history are completely separate academic departments in universities and there is a limited communication between these two camps. So the students can't grasp the complexities related with human/environment interactions (Boehm et al., 2003). In another study named MIH (Multicultural Interdisciplinary Handbook) Project, researchers developed a handbook including tools for learning history and geography in a multicultural perspective. Its purpose is to provide new methodological tools that could help teachers and secondary school pupils to develop a deeper understanding about the cultures and languages of other nations and construction of a European identity via history and geography integration. As the result of the project essential outcomes were carried out in terms of realizing their goal (Penalvo et al., 2012).

As seen above, despite it is strongly promoted, there is limited integration between these two courses' instruction in practice. Competency and perceptions of the teachers had an important role in growing the interdisciplinary instruction up. So this research aims obtaining the knowledge and opinions of prospective history and geography teachers about integrating these two courses.

METHODOLOGY

The main purpose of this research is to elicit the knowledge and perceptions of prospective history and geography teachers regarding interdisciplinary instruction and integrating history and geography courses. The design of this qualitative research is phenomenology which describes the meaning for several individuals of their lived experiences of a concept or a phenomenon (Cresswell, 2013). Participants were 40 prospective history and 36 prospective geography teachers. The research was carried out in 2014-2015 academic year. A questionnaire including open ended-questions was employed as data collection tool after specialists' opinions were taken and pilot study was made. After the data was descriptively analyzed, findings were presented in tables and typical answers were cited.

FINDINGS

In this section answers of the prospective teachers to the questions were presented. Some of them were displayed in tables and some others were given in prose form. Frequently mentioned categories were illustrated by citations from the speeches of the participants.

Opinions of the prospective teachers about the definition of interdisciplinary instruction

Prospective teachers were firstly asked "*how do you define interdisciplinary instruction?*". Findings extracted from the answers to this question are summarized in Table 1.

Table 1: Prospective History and Geography Teachers' Definitions of Interdisciplinary Instruction

Categories	Prospective History Teachers		Prospective Geography Teachers	
	<i>f</i>	%	<i>f</i>	%
Instruction which based on the cooperation/interaction between lessons	32	80	28	78
Evaluation of a problem or question from different disciplines' view points	2	5	–	–
Gathering related lessons under a single roof	1	3	4	11
No answer	5	13	4	11
TOTAL	40	100	36	100

As it is shown in the table most of the participants defined the interdisciplinary instruction as "instruction which based on the cooperation/interaction between disciplines". One of the answers that can be given as an example to

this category is “teaching the different disciplines interactively within a common theme framework”. The second example is “relating the subject with other subjects covered in different lessons. For example while telling an historical event using geography by considering the climate and landforms in which the event took place” The third one is “relating the lessons with others instead of covering them individually. While discussing a subject it’s not enough to explain it within the boundaries of a certain discipline.” Two of the prospective history teachers had a problem or question based look at the concept. Against this 1 prospective history and 4 prospective geography teachers had a misidentification about interdisciplinary instruction that “gathering related lessons under a single roof”. Totally 9 prospective teachers didn’t respond the question.

Opinions of prospective teachers on their source of knowledge about interdisciplinary instruction

The second question asked to the prospective teachers was “What is the source of your knowledge about interdisciplinary instruction?”. Findings were displayed in Table 2.

Table 2: Prospective History and Geography Teachers’ Source of Knowledge about Interdisciplinary Instruction

Categories	Prospective History Teachers		Prospective Geography Teachers	
	<i>f</i>	%	<i>f</i>	%
Courses attended at university	16	40	15	42
Preparation books and special courses for teaching entrance exam	15	38	14	39
Personal researches	6	15	3	8
Teacher training high school	–	–	2	6
No answer	8	20	5	14
TOTAL	40	100	36	100

According to the table prospective teachers obtained knowledge about interdisciplinary instruction especially in the courses they attended in university. One of the prospective teachers mentioned that “we learned about interdisciplinary education in the scope of the subject of preparing program proposal through the program development lesson in faculty”. Yet there is a remarkable issue that preparation books and special courses for teaching entrance exam is another important source of their knowledge. As an example a prospective teacher said that “this concept was described in the special course for teaching entrance exam. I’m a student in faculty of education. But there wasn’t given any knowledge to us about this.” Moreover personal researches and high school education are the other sources for the participants.

Opinions of prospective teachers about the lessons which can be integrated with history/geography lessons

The prospective teachers were thirdly asked “Which lessons can be integrated with history/geography lessons”. Findings were shown in Table 3.

Table 3: Opinions of prospective teachers about the lessons which can be integrated with history/geography lessons

Categories	Prospective History Teachers		Prospective Geography Teachers	
	<i>f</i>	%	<i>f</i>	%
Geography	40	100	–	–
History	–	–	26	72
Sociology	22	55	3	8
Psychology	12	30	–	–
Philosophy	14	35	2	6
Literature	15	38	9	25
Biology	–	–	20	56
Mathematics	2	5	7	19
Chemistry	1	3	11	31
Physics	2	5	16	44
Art	6	15	2	6
All lessons	2	5	3	8
TOTAL	40	100	36	100

As it is seen in the table prospective history teachers mostly mentioned “geography” and similarly prospective geography teachers mostly referred “history” as lessons appropriate to integration. One of the prospective history teachers stated that “*History lesson can be integrated with geography to establish place-time and cause-effect relationship.*” The other said that “*geography should be firstly and certainly integrated with history because their subjects are closely related with each other.*” The other often mentioned lessons by prospective history teachers are sociology, literature, philosophy and psychology whereas by prospective geography teachers are biology, physics and chemistry.

Opinions of prospective teachers on integration between history and geography lessons

In fourth question prospective teachers were asked that “*what do you think about the integration between history and geography lessons?*”. 39 prospective history teachers answered this question positively and 1 negatively. Besides the answers of 32 prospective geography teachers were positive while 2 of them were negative and 1 of them was doubtful. 1 prospective geography teacher did not answer this question.

Opinions of prospective teachers about their own sufficiency of integrating history/geography lessons

The prospective teachers were fifthly asked “*Do you feel yourself sufficient or not in integrating history and geography lessons?*”. According to the answers 29 of prospective history teachers felt themselves sufficient while 7 thought to be insufficient and 4 partially sufficient. 11 out of 36 prospective geography teachers regarded themselves sufficient, 14 insufficient and 11 partially sufficient.

Opinions of prospective teachers about through which subjects the history/geography lessons can be integrated

The sixth question asked to the prospective teachers was “*Through which subjects the history/geography lessons can be integrated?*”. The findings were displayed in Table 4.

Table 4: Opinions of prospective teachers about through which subjects the history/geography lessons can be integrated

Prospective History Teachers			Prospective Geography Teachers		
Categories	<i>f</i>	%	Categories	<i>f</i>	%
Political history	21	53	Human geography	22	61
Social history	11	28	Political geography	10	28
Ancient history	5	13	Cartographic subjects	2	6
Medieval history	2	5	Geological times	6	17
Ottoman history	5	13	Geopolitical subjects	3	8
Economical subjects	5	13	Natural Systems	2	6
World history	3	8	Global environments	4	11
All subjects	8	20	All subjects	1	3
Turkish history	4	10	Basic concepts and methodology of geography	4	11
TOTAL	40	100		36	100

As it is seen in the table political and social history were mostly stated subjects by prospective history teachers and human and political geography were mostly mentioned by prospective geography teachers. In this regard answers of two groups seemed equivalent. One of the prospective geography teachers stated that “*subjects related with people like population and migration in human geography are strongly related with history. So we can integrate these two lessons on this kind of a subject.*” A prospective history teacher said that “*the causes for the migration of Turks from Middle Asia were climate, natural resources and some political issues. It can be useful to establish a connection from this point.*” In addition the two groups of prospective teachers gave various answers about the subjects relevant to integrate.

Opinions of prospective teachers on the teaching methods and techniques which can be used for integrating history and geography lessons

The other question asked to the prospective teachers was “*which methods and techniques can be used to integrate history and geography lessons?*” Their answers were summarized in Table 5.

Table 5: Opinions of prospective teachers on the teaching methods and techniques which can be used for integrating history and geography lessons

Categories	Prospective History Teachers		Prospective Geography Teachers	
	<i>f</i>	%	<i>f</i>	%
Using visual materials	22	55	–	–
Observation trip	12	30	3	8
Brainstorming	2	5	–	–
Project based learning	1	3	4	11
Inquiry based learning	2	5	10	28
Problem based learning	4	10	3	8
Question and answer	2	5	–	–
Discussion	2	5	3	8
Case study	–	–	7	19
Cooperative learning	–	–	4	11
Lecture	–	–	4	11
No answer	12	30	4	11
TOTAL	40	100	36	100

The methods and techniques based on using visual materials and observation trips were mostly referred by prospective history teachers according to the table whereas inquiry based learning was often stated by prospective geography teachers. Although various methods and techniques were mentioned by the participants, the number of participants didn't respond the question was not less.

Opinions of prospective teachers on the benefits of integrating history and geography lessons

The last question asked to the prospective teachers was “*What can be the benefits of integrating history and geography lessons?*” Findings were shown in Table 6.

Table 6: Opinions of prospective teachers on the benefits of integrating history and geography lessons

Categories	Prospective History Teachers		Prospective Geography Teachers	
	<i>f</i>	%	<i>f</i>	%
Enables the retention of knowledge	14	35	12	33
Provides effective learning	9	23	11	31
Makes subjects concrete	10	25	–	–
Provides ease of learning	8	20	1	3
Develops thinking skills	7	18	7	19
Helps to establish cause and effect relationships	7	18	4	11
Develops intellectual knowledge	1	3	–	–
Makes lesson interesting/entertaining	–	–	5	14
Expands the perspective	–	–	4	11
Has no effect	–	–	2	6
No answer	1	3	4	11
TOTAL	40	100	36	100

As it is seen in Table 6, one of the most referred benefits of integrating history and geography lessons that prospective history and geography teachers mentioned is that it enables the retention of knowledge. In this category one of the prospective teachers said that “*The students easily forget historical subjects they learn in lessons. I think the reason is that subjects are detached from real life. Integrating geographical subjects to history lessons helps to remove this disconnection and so make the retention of knowledge easier.*” The benefit of integrating the two lessons that is believed to provide effective learning is another mostly mentioned subject by the participants. One of the participants stated that “*This allows for a more efficient learning process by enabling the information transfer.*” Development of thinking skills, establishment of cause and effect relationship, making subjects concrete, providing ease of learning were the other expected benefits of this integration. Only two of the prospective geography teachers answered that it has no effect.

CONCLUSION AND SUGGESTIONS

According to the results of this study most of the prospective teachers described the interdisciplinary instruction as the instruction which based on the cooperation/interaction between lessons. There are some others who have some misconceptions and have no idea about the concept. Moreover prospective teachers mentioned mostly the courses they attended at university as the source of their knowledge about interdisciplinary instruction. Yet for quite a large part of the participants preparation books and special courses for teaching entrance exam were the sources of knowledge. This may be interpreted that the courses in faculty of education is not sufficient to inform them about interdisciplinary instruction. Due to these results it can generally be suggested that the number of courses in educational faculties covering interdisciplinary instruction should be developed in terms of quantity and quality.

As another result most of the prospective history teachers described the geography and most of the prospective geography teachers mentioned the history as the most appropriate disciplines for integration. So they may be enthusiastic and enterprising to integrate these two disciplines when they start to work. Most of them already mentioned that they are keen on this integration in their answers to the fourth question. Besides the prospective teachers described various subjects from their subject areas appropriate to this integration, related various methods and techniques with interdisciplinary history and geography instruction. Moreover they expressed lots

of expected benefits of this integration. But it was identified that many prospective teachers felt themselves insufficient for this. As another suggestion history and geography education departments specially should cooperate to develop prospective teachers' knowledge and experiences in theory and practice to integrate these two disciplines. In doing so, the positive perceptions and enthusiasm of prospective history and geography teachers can be supported.

References

- Adler, M.& Flihan, S. (1997). *The interdisciplinary continuum: Reconciling theory, research and practice*. (Report Series No.2.36). NY: Center On English Learning And Achievement.
- Akins, A & Akerson V.L. (2002). Connecting science, social studies, and language arts: An interdisciplinary approach, *Educational Action Research*, 10(3), pp.479-498.
- Applebee, A.N.& Adler, M., Flihan, S. (2007). Interdisciplinary curricula in middle and high school classrooms: Case studies of approaches to curriculum and instruction. *American Educational Research Journal*, 44 (4), pp. 1002 –1039.
- Boehm, R.G, Saxe, D.W., Rutherford, D.J. (2003). *The best of both of worlds: Blending history and geography in the K-12 Curriculum*. Gilbert M. Grosvenor Center for Geographic Education. <http://files.eric.ed.gov/fulltext/ED476500.pdf>
- Bradley Commission on History in Schools. (1988). Building a history curriculum: Guidelines for teaching history in schools. Washington, D.C.: Educational Excellence Network. <http://www.nche.net/document.doc?id=38>
- California State Board of Education (2005) History–social science framework for California public schools: Kindergarten through grade twelve. 2005 Edition with New Criteria for Instructional Materials.
- Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among the five traditions* (3rd Ed.). CA: Sage Publications.
- Duerr, L. L.(2008). Interdisciplinary instruction. *Educational Horizons*, 86(3), pp. 173-180.
- Fidalgo-Neto, A.A., , Lopes, R.M., , Magalhães, J.L. , Pierini, M.F.& Alves, L.A. (2014). Interdisciplinarity and teacher education: The teacher's training of the secondary school in Rio De Janeiro—Brazil. *Creative Education*, 5, pp. 262-272.
- García-Peñalvo, F.J., Zangrando, V.& Seoane Pardo, A.M., García-Holgado, A., Szczecinska, J., Baldner, J.M., Consonni, A., Crivellari, C. (2010) . *Multicultural interdisciplinary handbook (MIH): Tools for learning history and geography in a multicultural perspective*. GRIAL (Eds.), Spain: KADMOS.
- Jones, C. (2009). Interdisciplinary approach : Advantages, disadvantages, and the future benefits of interdisciplinary studies, *ESSAI*, 7, Art. 26.
- Krishnan, A. (2009). Five strategies for practicing interdisciplinarity. ESRC National Centre for Research Methods: NCRM Working Paper Series, pp.1-11.
- Lee, J. T.-H. (2007). Interdisciplinary teaching in anthropology and history. *Analytic Teaching*, 27(2), pp. 14-17.
- Mansilla, V. B. (2005). Assessing student work at disciplinary crossroads. *Change*, 37, pp. 14-21.
- Marzano, R. J. (1991). Fostering thinking across the curriculum through knowledge structuring. *Journal of Reading*, 34(7), pp. 518-525.
- Newell, W. (1994). Designing Interdisciplinary Courses. *New Directions for Teaching and Learning*. 58, pp.35-51.
- Newell, W. H. (2007). The role of interdisciplinary studies in the liberal arts. *Liberal Arts Online*, 7(1).

Reading Literacy Skill Of 15-Year-Old Slovak Students Within International And National Context

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ABSTRACT

The article is devoted to reading literacy, which is tracked by international and national measurement. Based on the analysis of the results of OECD PISA international and national testing – Testing 9 and testing of reading literacy of the 9th graders students in elementary school contribution points to the level of reading literacy Slovak 15-year-olds. Attention is given to problematic aspects of students' reading performance.

Currently, there are theoretically defined several models of literacy: Base literacy, functional literacy, literacy as a socio-cultural phenomenon and e-Literacy (Gavora, 2002, p. 171 – 180) defines reading literacy model of functional literacy as a comprehensive set of reading skills necessary for effective work with the text. Its aim is the reader who has a readership competencies that enables it to work with different kinds of texts used for different purposes. Text information processing is carried out of the process: identifying the hierarchy of information in the text, distinguish important information from marginal, looking for relationships between the main idea and supporting information, compression (squeezing) of the text, draw conclusions from text, extract the explicit and implicit information (reading between the lines) evaluation of the use, usefulness, novelty, reliability and truthfulness of information and critical reflection.

Reading literacy is seen as a non-subject and as a penetration skill. As our school system (in Slovak Republic) does not have special teaching subject in which pupils learn to work effectively with the text, the basic skills of reading literacy learner acquires on the first lessons on the language. Later it is necessary to develop these skills in all subjects. While at the first level of primary school is the development of reading skills within a number of subjects within the competence of one particular teacher, the second step is getting this process in a more complex situation because there is already a sharing of content, but also the competence of different teachers (Lapitka, 2006, p. 85).

The timeliness of that issue is especially increasing in the face of outputs of various international measurements (PISA, PIRLS) that have made the global professional and educational forums, discussion focused on the level of reading literacy of students and measures to increase the level of reading skills of students.

The Slovak Republic is among the countries that the international PISA are below average or average in OECD countries. Fifteen years old-Slovak students achieved in reading literacy test performance a statistically significantly lower result than the OECD average. Support for the development of reading literacy therefore requested a general change in the concept of teaching the subject Slovak language and literature, where a team of experts started to work after the results of PISA 2003. Their analysis has become one of the starting arrangement changes as the content of the subject and part of the new concept of teaching Slovak language and literature, which was published in 2007 as a proposal of curricular transformation of the Slovak Language and Literature. The basic objective has become to develop communication skills of students based on understanding the language as an instrument of thought and communication between people, which was reflected in the gradual development of communication competences within communication and experiential learning model (Gregorová, Hincová, Lapitka, 2007). The alarming findings of international research OECD PISA attention of the National Institute of Certified Measurement of Education (NÚCEM) which right from its inception (2008) began to prepare instruments for evaluating mathematical and reading literacy of students nationally. Since 2008, it carries out testing of mathematical and reading literacy of the ninth year of primary school on a representative selection of primary schools with instruction in Slovak and Hungarian nation-wide testing of students and 9 of primary schools under the name Testing 9th.

READING LITERACY IN THE EDUCATIONAL STANDARDS FOR THE SUBJECT OF SLOVAK LANGUAGE AND LITERATURE

Reading literacy is included in the educational standards for the subject of Slovak language and literature in both components of the object (component linguistic, literary component). The basic structuring element in language are components as communication language and one of them is reading comprehension. The literature component of the subject is reading comprehension as it develops fully-conceptually in logical and figurative-metaphorical context (Gregorová, Vaškaninová, 2011, p. 46 – 47).

The concept of educational standards emphasizes the ability to recognize the aim and context of the communication situation, supports the student's ability to understand the nature of the text, search in the text the problem or the issue, the to define and solve it, in order, to apply the theoretical knowledge and practical skills of listening and reading comprehension to real life situations.

READING LITERACY IN PISA RESEARCH

The main objective of the OECD PISA international research is to determine the level of knowledge and skills that are relevant for the involvement of young people in life. "The research is designed to provide educational policy-makers in various countries and provide important information about the functioning of their education systems' (Palečková, Tomášek, Basl, 2010, p. 9). It aims at determining the level of reading, mathematical and scientific literacy of fifteen year old pupils.

The essence of reading literacy in PISA is the ability of the fifteen year old student to understand written text, plus emphasis is also placed on control procedures, understanding of concepts and the ability to use knowledge in different situations and not to reproduce information which is specific to individual subjects. To the foreground is becoming the applying knowledge to new situations (Koršňáková, Kováčová, Heldová, 2010, p. 4).

PISA framework in the area of reading literacy is built on three fundamental aspects:

- 1) texts (different types of written materials)
- 2) activity (cognitive processes of the reader when working with text)
- 3) situations (intended use of the text in terms of its author).

Requirements for the reading skills of students represents the seven levels of reading literacy. 1b is the lowest level and Level 6 is the highest level of reading skills.

READING LITERACY IN TESTING 9 (T9)

Nation-wide testing of students is Grade 9 school certification testing. Its ambition is to obtain objective and reliable information on the performance of students when they leave the school. Its aim is to give students information about what the results are compared with other pupils of the 9th graders in Slovakia, schools, feedback and comprehensive picture of the test object.

Priority status of the reading literacy was also reflected in testing 9 as a certain percentage of tasks aimed at reading comprehension. Testing 9 understand reading comprehension "as cross-subject competence as a condition for successful progress of students in school practice. Reading literacy is not just a good command of reading techniques, but assumes the understanding of the read text and other information work '(Testovanie 9-2013, 2013, p. 4 – 13).

READING LITERACY BY TESTING READING LITERACY FOR THE 2ND LEVEL OF PRIMARY SCHOOLS AND FIRST TO FOURTH YEAR OF GRAMMAR SCHOOLS

Reading literacy tests based on the definition of reading literacy PISA, accepting some situations and processes of continuous and discontinuous reading the text as specified in the above mentioned study and teaching of valid documents of the Slovak language and literature.

Distinguish the four basic reading situations:

- 1) reading for private purposes (letters, fiction, various popular informational texts);
- 2) reading for public purposes (official documents and information about public events);
- 3) reading for professional purposes (to know how the labor market);
- 4) reading for education (to gather information in a larger classroom tasks).

ANALYSIS OF THE ROLE OF THE INTERNATIONAL RESEARCH OECD PISA COMPARED WITH THE TASK OF TESTING 9 (T9) AND TESTING READING LITERACY (RL)

Tasks that in their test uses the OECD study PISA have the same structure. Start incentive that introduce you to the student (short, long text, image, table, graph), followed by incentives for more independent issues, the so-called items. PISA tests include items with multiple choice questions from a number of options offered and make your own questions requiring answers.

Tasks in the T9 are closed items with multiple choice questions from the four options, the majority of items is linked to demonstrations and a small percentage of the items is free, respectively is linked to shorter texts.

Testing reading literacy of Grade 9 school includes tasks of different types: open - with the formation of short answers and closed - with a choice of one correct answer from four options. But predominantly item choice questions from four options.

In the PISA study, the most frequently used texts by:

- a) forms: continuous; incoherent; combined; composite, which consist of several separate text
- b) type: description, narration, exposition, argumentation, instructions.

Demonstrations in the PISA testing are based mainly on the substantive - professional and popular science texts (eg. Technical descriptions, journal texts).

T9 uses texts by:

- a) forms: continuous; incoherent; combined
- b) contents: art; kind.

Artistic and continuous text outweigh in testing 9, which stems from the fact that the lessons of the Slovak language and literature, primarily works with literary texts.

When choosing the type of text in testing reading literacy of 9th Graders at school it reflects the specificity of PISA testing research, which focuses on incoherent texts (graphs, charts, etc.). Therefore, to test more closely it needs to operate with a discontinuous combined texts.

The PISA study within individual items is pursuing the following actions to work with text:

- a) finding and obtaining information;
- b) the integration and interpretation;
- c) reflection and evaluation.

Activities vary in complexity, progressing from simple joining parts of the information through categorizing ideas according to given criteria to critically examine and foresee the creation of a text.

Items in the 9 testing of the subject Slovak language and literature are focused not only on remembering and understanding, but also they verify the depth of knowledge and skills, the ability of students to apply knowledge, and discover the strategy for solutions. In terms of cognitive performance items can be divided into the following levels:

- a) memorizing and understanding** - a simple thought operations, assignment, queuing, grading, matching;
- b) specific transfer** - complex thought operations, application of knowledge - induction, deduction, demonstration, evidence, etc .;
- c) non-specific transfer** - complex applications that require a creative approach, problem solving, evaluation and so on.

Items in testing reading literacy pursue a variety of types of activity when working with text, such as:

- a) **obtaining information** - ability to identify explicit information;
- b) **interpretation of the text** - to deduce implicit information, compare information from the text, organize information according to importance and continuity, draw the main idea, explain the meaning of some of the text to include evidence from the text;
- c) **thinking and assessment** - the ability to critically analyze and evaluate the content and format of the text through their knowledge and experience, substantive arguments, present evidence beyond the text.

We analyzed a sample of released jobs - a study of the OECD PISA 2003, 2009 because we did not have available role from the 2012 PISA tests but based on the hypothesis that the nature and structure of the OECD PISA tests, we came to conclusion that they are stable.

From testing at the national level, we chose to analyze test in Slovak language and literature and loose T 9-2013 task of testing reading literacy of the 9th graders of elementary school in school year 2010/2011 as it also includes parts of the population samples of PISA.

The analyzed sample tasks - tasks from reading literacy used in PISA testing in 2003, 2009 have the same structure, beginning to stimulus - continuous, discontinuous or combined motivational text. Mainly reflect the substantive text (eg. homework Balloon, tooth brushing, give blood). Literary texts, on which it is based reading in Slovak schools are represented in small quantities (eg. It is just a game). In 2003, the task based on the consolidated text about two-thirds of all tasks of reading literacy. Had the largest percentages of explanatory texts.

The released PISA tasks represent not only different forms and types of texts and different levels (lowest 1b - the highest 6), types of activities carried out by the pupil in addressing these challenges and different types of questions: Question choice questions from four options open question with the creation of answers, closed questions with answers formation. In terms of the type of questions it was in the OECD PISA study in 2003 used approximately 43% of the outstanding issues with the free formation of answers (Koršňáková, Heldová, 2006).

Test of the Slovak language and literature T 9-2013 contains four samples in the form of continuous text and one combined text. Tasks are closed choice questions from four options. Twenty items were linked to demonstrate the various types of texts - artistic and informative. Five items are free, some are linked to short texts. Most of the items required from the pupils more complex operations and the application of knowledge (76%). A small percentage of jobs (8%) is focused on remembering and understanding a more complex application that requires a creative approach, problem solving, evaluation (16%).

Released samples of each task reading literacy from r. 2011 are appropriate to the age of students. As in the OECD PISA study begin stimulus in the form of continuous (Underground Tatra field), discontinuous (youth and media, Equity poster) and combined text (Beauty of Slovakia). Behind every motivational text followed by two to three separate tasks (10 tasks). The majority (60%) are open to the creation of jobs with short answers, a smaller percentage (40%) closed multiple choice questions from four options. Six tasks is to integrate and interpretation. The author tests the ability of pupils to follow them and to look in the preview information that you enter in the job or explicitly named with the ability to read with understanding incoherent texts and interpret them.

In PISA testing back in 2003 students successfully managed a combination of two of the above information. Difficulties have caused problems with a combination of more information at greater length below. They mastered as well the determination of topics, concluding continuous and discontinuous educational texts, selection of evidence directly from the text of the citation or paraphrase. As Insufficient was proven to show the level of thinking and speaking abilities of students in self-formulated answers to open questions (Koršňáková, Heldová, 2006, p. 24 – 25).

In T 9-2013 of the Slovak language and literature the students have mastered really good job focusing on reading comprehensions which were included in the first cognitive level as well as the role of literature linked to demonstrations of artistic and dramatic text. As one of the problematic role turned a process which was focused on reading comprehension, covering the demonstration of educational text (Správa Testovanie 9-2013, 2013).

Analysis released task of testing the RL showed that the percentage of students is relatively large with closed multiple choice questions from four options for tracking pupils' ability to find simple information explicitly stated in the text. Moderately difficult to difficult are things for students who have had bi-annual report card on the 9th grade of the Slovak language and literature, grade 3 tasks aimed at the integration and interpretation, especially when it comes to working with discontinuous texts (chart, advertising leaflets). Open task of making short answer where to monitor the capacity of students to think and evaluate arguments was Wednesday to be difficult even for students graded first.

CONCLUSIONS

Results of the OECD PISA study, T 9-2013 and testing reading literacy shows that Slovak students are successful in identifying the correct answers in closed tasks and answering open-ended tasks with a lower degree of difficulty. They thus have significant problems with finding clear information in the text in unambiguously identifying themes, significantly lagging behind in activities requiring critical thinking for example in evaluation, synthesis, creativity and reformulation of the correct answer on their own reasoning with respect to the questioned text. Better performance was proven in achieving targets based on continuous text as in tasks based on discontinuous, combined texts as they had more difficulty with comprehension of the material – especially in specialized texts.

The starting point for improving reading literacy levels are the requirements for the concepts that are directly integrated in the national educational program and educational standards for the subject Slovak language and literature in key language competences. The transformation of the educational standard, which is supported by communication and experiential learning model and activities aimed at developing pupils' reading competence, respectively to set their knowledge, skills and attitudes aimed at receiving the text as its analysis and interpretation, but also in the process of implementation of school practices which are met with positive reactions of teachers.

In addition, the results of testing 9 are central to the enrollment of students in secondary schools under the Education Act. School directors, teachers, parents and students therefore attach great importance to the national

measurement as manifested itself that is preparing pupils. Performances in testing indicate that students in the learning process are often working with continuous text in comparison to discontinuous. They are trained on multiple choice questions.

In doing so, as shown by the results of the testing, it is necessary to combine the competence development of reading comprehension to speaking and writing capabilities. If we give students more space for written and oral expression, critical thinking of the students will solve tasks more open and more attention will be given to working with incoherent processes in combined texts.

We fully agree with K. Hincová (2009, p. 97) that "if we want to change the students, first we have to change teachers". It is especially vital in the preparation of the future teachers to have access to reassessment of specialization in subjects and teaching disciplines. To the second degree in the study of teaching academic subjects are supporting the core themes of knowledge is bound to the subject field and didactic context of subject, but mostly only in theory. Master's degree graduates need their knowledge of the essential content and methodology of disciplines of their subject specialization, plus as well the theoretical context, trade union didactics in the respective specialization, as they need to apply them in practice. Often we see the poor knowledge of school documentation for recent graduates of teachers' unions. Each college should be closely based on the content and methods of teaching in primary and secondary education.

References

- Gavora, P. (2002). Gramotnosť – vývin modelov, reflexia praxe a výskumu. In *Pedagogika, LII* (pp. 171-180).
- Gregorová, I. – Hincová, K. – Lapitka, M. (2007). *Návrh kurikulárnej transformácie predmetu slovenský jazyk a literatúra*. Bratislava:ŠPÚ.
- Gregorová, I. – Vaškaninová, K. (2011). Podpora rozvoja čitateľskej gramotnosti v štátnom vzdelávacom programe. In *Výsledky PISA 2009. Zborník príspevkov konferencie* (pp. 46-47). Bratislava:NÚCEM.
- Hincová, K. (2009). Čitateľská gramotnosť – nestačí vedieť čítať. In *Stav a rozvoj funkčnej gramotnosti. Zborník z konferencií*. Bratislava.
- Koršňáková, P. – Kováčová, J. – Heldová, D. (2010). *Národná správa OECD PISA SK 2009*. Bratislava:NÚCEM.
- Koršňáková, P. – Heldová, D. (2006). *Čitateľská gramotnosť slovenských žiakov v štúdiu PISA 2003*. Bratislava:NÚCEM.
- Lapitka, M. (2006). Témy k projektom PIRLS a PISA. Interný pracovný materiál, 2004. In *Čitateľská gramotnosť slovenských žiakov v štúdiu PISA 2003* (pp. 85). Bratislava:ŠPÚ.
- Palečková, J. – Tomášek, V. – Basl, J. (2010). *Hlavní zjištění výzkumu PISA 2009. Umíme ještě číst?* Praha:Ústav pro informace ve vzdělávání.
- Správa Testovanie 9-2013. Priebeh, výsledky, analýzy*. (2013). Bratislava:NÚCEM.
- Testovanie 9-2013. Priebeh, výsledky, analýzy*. (2013). Bratislava:NÚCEM.
- Testovanie matematickej a čitateľskej gramotnosti v školskom roku 2009/2010*. Výskumná správa. (2010). Bratislava:NÚCEM.

Relationship Of Job Satisfaction Of Elementary School Music Teachers With Several Variables

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ABSTRACT

The role of teaching a person is given to schools and teachers after the family. Educations of children firstly starting in the family continue with the teachers in the school. Particularly the figure of teacher is very important for the child at school age. The fact that the elementary school teacher provides qualified education can depend upon the satisfaction that he/she provides from the situation that he/she is in. It is thought that increasing the material and spiritual satisfactions that the teacher obtains from his/her job is a significant factor for raising students as healthy individuals. The objective of this study is to analyse attitudinally the job satisfactions of elementary school music teachers in Tokat in Turkey according to several variables. With this purpose, Minnesota Job Satisfaction Scale including 20 statements was used. Data were obtained between 20 March and 2 April 2015. Demographic information such as age, sex, marital status, educational background, working period and the statements intended for the assessment relating to job satisfaction are included. In the study, the scale was distributed to 60 volunteer music teachers working in elementary schools and all of these teachers responded. With data obtained, job satisfactions of the teachers were analysed attitudinally by several variables.

INTRODUCTION

In the organizational behaviour field, attitudes developed related to the individual job are considered quite important. These attitudes are related to the job satisfaction of the personnel. The satisfaction of personnel from the variables related to his/her job will affect the achievement of satisfaction in his/her job. According to the results of research made by Weaver (1977), Holdaway (1978), Schackmuth (1979), Medved (1981), the attitudes of teachers related to their job have a significant effect on job satisfaction (Tanrıöğen, 1997). The job satisfaction is general result of attitudes and means that the personnel are good physically and psychologically. It is a feeling occurring as a result of the interaction of outputs obtained from work and work values which they present for their job. (Bakan and Büyükbese, 2004). Schermerhorn (2005: 347) defines the job satisfaction as "feelings and positive or negative opinions of the personnel on their jobs". The concept described with the expressions such as job satisfaction, job contentment, and professional satisfaction is defined as relieving and calming feeling that an individual tries to obtain from job, managers, working group and working organizations (Bingöl, 2003: 270). According to Aswathappa (2010: 177-179), high job satisfaction of the personnel increases his/her efficiency, decreases lack of continuity for his/her and reduces the accidents and stress. The high level of job satisfaction of the personnel is considered important in occupational groups involved in an interaction and one-to-one communication with people. Therefore, it is observed in most of the related researches that the personnel in medical and educational field are working in a satisfied manner with their job. Focus of this research is on job satisfaction of teachers. The role of teaching a person is given to schools and teachers after the family. Educations of children firstly starting in the family continue with the teachers in the school. Particularly the figure of teacher is very important for the child at school age. The fact that the elementary school teacher provides qualified education can depend upon the satisfaction that he/she provides from the situation that he/she is in. It is thought that increasing the material and spiritual satisfactions that the teacher obtains from his/her job is a significant factor for raising students as healthy individuals. With this purpose, job satisfactions of elementary school music teachers in Tokat in Turkey were analysed attitudinally according to several variables.

THE STUDY

This research in which the job satisfaction of elementary school music teachers is analysed according to several variables has descriptive quality. The research is in survey model. Survey models are the approaches of research made on a sample group selected from a universe including large groups and aiming to examine a situation which existed in the past or exists at the present. A case, an individual or an object subject to the research are tried to be defined within its own condition and as existing (Karasar, 1994). A survey was used for collecting data. The survey consists of two sections. In the first section, a Personal Information Form including demographic information such as age, sex, marital status, educational background, and working period was used and in the second section, Minnesota Job Satisfaction Scale consisting of 20 statements intended for the assessment relating to the job satisfaction of teachers was used. Minnesota Job Satisfaction Scale (MJSS) is a 5-point likert scale consisting of 20 questions developed by Weiss et al. in 1967 for measuring the job satisfaction (1= very dissatisfied, 5= very satisfied). There are five options defining the satisfaction level of the person within each question. The translation from English to Turkish of Minnesota Job Satisfaction Scale was made by Deniz and Güliz Gökçora from Hacettepe University. The translation was made again later and its validity was

approved and its test was made on the personnel by A. F. Boycan from Bogazici University (Özyurt, 2003: 39). Data were obtained between 20 March and 2 April 2015. There are 69 elementary school music teachers working in the city centre of Tokat. In the study, the scale was distributed to 60 music teachers volunteer for participating into the study and all of these teachers made a feedback. With the two-section survey used in the study, the demographic characteristics of elementary school music teachers were obtained and it was determined whether the points of job satisfaction varied according to variables such as age, sex, marital status, educational background, seniority and wage or not.

Table 1. Demographic characteristics of teachers

Variables		n	%
Age	21-30	20	33.3
	31-40	39	65
	51 and above	1	1.6
Sex	Male	36	60
	Female	24	40
Marital status	Married	49	81.7
	Single	11	18.3
Educational Background	Undergraduate	56	93.3
	Post graduate	4	6.7
Seniority (working period)	1-5 years	20	33.3
	6-10	31	51.7
	11-15 years	7	11.7
	21 years or above	2	3.3
Economical satisfaction	Little	23	38
	Moderate	12	20
	Dissatisfied	25	41.7

Analysis of Data

Kolmogorov-Smirnov and Shapiro-Wilk test were applied in order to test whether the distributions of points obtained from Minnesota Job Satisfaction Scale are normal or not and it was understood that the observation values did not show normal distribution in both cases. Among non-parametric tests, Mann Whitney U-Test for double groups and Kruskal Wallis H-Test for three or more groups were applied for evaluating whether there is a differentiation depending upon the demographic variables of teachers or not as the distribution was not normal.

FINDINGS AND INTERPRETATION

The relationship between job satisfaction points and demographic characteristics of teachers participating into the study is given in the following table.

Table 2. Relationship between job satisfaction points and demographic characteristics of teachers

Professional	Group	n	Mean Rank	Total Rank	U	p
Sex	Male	48	32,94	1186,00	344,000	,183
	Female	12	26,83	644,00		
Marital Status	Married	49	29,67	1454,00	229,000	,438
	Single	11	34,18	376,00		
Educational Level	Undergraduate	56	29,65	1660,50	64,500	,158
	Post graduate	4	42,38	169,50		

In comparisons, Mann WhitneyTest was used *: $p < 0,05$,

The relationship between job satisfaction points of elementary school music teachers and variable such as sex, marital status and educational level was analysed and the results were summarized in Table 2. According to the findings of this research, there is no significant difference between the job satisfaction points of Male and Female teachers. In other words, there is no relationship between sex and job satisfaction of teachers. When the literature is reviewed, the findings of studies that there is no relationship are observed. While Yıldız et al. (2003), Kurçer (2005), Keser (2005), Sünter et al. (2006), Yelboğa (2008), Tözün et al. (2008), Taşdan (2008), Öztürk and Deniz (2008), Gençtürk and Memiş (2010), Yılmaz and Ceylan (2011), Telef (2011), Yılmaz (2012) did not

determine a relationship between sex and job satisfaction in their researches, the relationship between sex and job satisfaction was determined in the researches made by Piyal et al. (2000), Keser (2006). According to the findings of this research, there is no significant difference between marital status (married or single) and job satisfaction points of teachers. In other words, there is no relationship between marital status and job satisfaction of teachers. When the literature is reviewed, the findings of studies that there is no similar relationship are observed. (Piyal et al. 2000; Yıldız et al. 2003; Kurçer 2005, Sünter et al. 2006; Durmuş and Günay, 2007) According to the findings of this research, there is no significant difference between educational level (undergraduate or post graduate) and job satisfaction of teachers. In other words, there is no relationship between educational level and job satisfaction of teachers. In literature, the study findings analysing the relationship between educational level and job satisfaction of the personnel can reach different results. For example; Piyal et al. (2000) and Alanyalı (2006) found a relationship between educational level and job satisfaction in their research. Öztürk and Deniz (2008), Telef (2011), Yılmaz (2012) did not observe a relationship between educational level and job satisfaction. However, it was stated that general job satisfaction of those who have high educational level is higher than those who have lower educational level (Baysal, 1981: 193). The relationship between job satisfaction points of elementary school music teachers and their satisfaction with regards to age, seniority and economical issue of elementary school music teachers was summarized in Table 3.

Table 3. Relationship between job satisfaction points of elementary school music teachers and their satisfaction with regards to age, seniority and economic issue

Job Satisfaction	Group	n	Mean Rank	Sd	X ²	p
Age	21-30	20	36,32	2	5,651	,059
	31-40	39	28,26			
	51 and above	1	1,50			
Seniority (working period)	5 years or less	21	35,68	3	3,570	,312
	6-10	31	28,71			
	11-15	7	27,64			
	21 years or above	2	16,50			
Economic satisfaction	Moderate	23	29,48	2	19,013	,000*
	Little	12	13,17			
	Dissatisfied	25	39,76			

In comparisons, Kruksal Wallis H-Test was used *: $p < 0,05$,

In this research, there is no significant difference between ages and job satisfaction points of teachers. According to this, for this study, it is possible to say that there is no relationship between age and job satisfaction. In literature, there are similar studies reaching the result that there is no relationship between age and job satisfaction (Yıldız et al. 2003; Kurçer 2005, Keser 2006; Sünter et al. 2006; Durmuş and Günay, 2007; Tözün et al., 2008; Taşdan and Tiryaki 2008; Öztürk and Deniz 2008; Yılmaz 2012). Charles and Titus (1999) and Mackonienè and Norvilè (2012) determined that there was a relationship between age and job satisfaction. Their studies showed that old personnel had more satisfaction than young ones. Charles and Titus stated that as the personnel gain experience and skills at work, the level of working performance and accordingly job satisfaction can increase. According to the findings of this research, there is no significant difference between seniority and job satisfaction points of teachers. According to this, for this study, it is possible to say that there is no relationship between the seniority and job satisfaction of the personnel. In literature, there are similar studies reaching the result that there is no relationship between seniority and job satisfaction (Yıldız et al., 2003; Kurçer, 2005; Sünter et al., 2006; Durmuş and Günay, 2007; Tözün et al., 2008; Taşdan and Tiryaki, 2008). Additionally, there are researches determined the relationship in this issue (Gençtürk and Memiş, 2010; Yılmaz, 2012). According to the findings, there is a relationship between economic satisfaction and job satisfaction of elementary school music teachers. This finding corresponds to the literature. Whether satisfied with job or not depends greatly on financial gain that the personnel obtain from his/her job. The personnel can meet the life and professional requirements with the financial gains that he/she obtains from his/her job. The researches show that wages are very important for the personnel and there are findings stating that there is a positive relationship between job satisfaction and level of income (Göktaş, 2007; Şahin et al. 2011). High income provides high satisfaction. According to Frank and Patrick (1988); balanced wage is more important for job satisfaction than high wage. The financial dissatisfaction of an individual reduces his/her performance, increases the possibility of resignation and lack of continuity and the dissatisfaction level from his/her job.

References

- Alanyalı, L. K. (2006). Effect of Organizational Sources of Stress Effects of Job Satisfaction with burnout and Vigor (Enthusiasm) Investigation. Unpublished Master Thesis. Uludağ University Social Science Institution, Bursa
- Aswathappa, K. (2010). Organizational Behavior. Mumbai: Himalaya Publishing House.
- Bakan, İ. and Büyükbeşe, T. (2004). Elements of Organizational Communication and Relations Between Job Satisfaction : A Field Study for Academic Organizations. Akdeniz University İ.İ.B.F. Journal, 7, 1-30.
- Baysal, A. C., (1981). Attitudes in Social and Organizational Psychology. İstanbul: Yalçın Ofset Publisher.
- Bingöl, D. (2003). Human Resources Management. İstanbul: Beta Press.
- Charles H., and Titus O. (1999). The Effect of Age on the Satisfaction of Academics with Teaching and Research. International Journal of Social Economics. 26 (4), 537-544.
- Durmuş S., Günay O. (2007). Nurses in Job Satisfaction and Influencing Factors Anxiety Levels. Erciyes Medical Journal. 29(2), 139-146.
- Frank E. S., Patrick A. K. (1988). Industrial and Organisational Psychology. Science and Practica Brooks/Cole Publisher.
- Gençtürk A. ve Memiş A. (2010) , Investigation of Primary School Teachers Towards Teaching Profession of Self- Efficacy and Job Satisfaction in terms of Demographic Factors. İlköğretim Online, 9(3), 1037-1054.
- Göktaş, Z. (2007). Investigation of Physical Education in the province of Balıkesir Teacher Job Satisfaction and Relationship with some Variables. Niğde University Physical Education ve Sport Science Journal. 1(1).
- Gürbüz, Z. (2008). Investigation of job satisfaction and burnout level of pre-school teachers in charge of in the Kars. Unpublished Master Thesis. Marmara University, İstanbul.
- Karasar, N. (1994). Research Methods : Concepts , Principles, Techniques. Ankara: 3A Research Training Consultancy Press.
- Keith D. (1988). Human Behavior in Business - Organizational Behavior. . Translations: Kemal Tosun e.t.c., İstanbul: İ.U. Faculty of Business Administration.
- Keser A. (2006). Investigation of Relationship Between Job Satisfaction Workload Level in Call Center Employees. Kocaeli University Journal of the Institute of Social Sciences. (11) 1, 100-119.
- Keser, A. (2005). The Relationship Between Job And Life Satisfaction in Automobile Sector Employees in Bursa Turkey. Journal of Work force Industrial Relations and Human Resources, 7(2).
- Kurçer M. A.(2005). Harran University Faculty of Medicine Physician Job Satisfaction and Burnout Levels. Journal of Harran University Medical Faculty. 2(3), 10-15.
- Mackonienė, R. ve Norvilė, N. (2012). Burnout, job satisfaction, self-efficacy, and proactive coping among Lithuanian school psychologists. Tiltai, 3, 199-211
- Özdevecioğlu, M. (2003). The relationship between job satisfaction and life satisfaction research to determine. 11th National Management and Organization Congress, 22-24, Afyon.
- Öztürk A. ve Deniz M. E. (2008). Investigation of Emotional Intelligence Capabilities of the Pre-School Teacher Job Satisfaction and Burnout Levels of Some Variables. İlköğretim Online Journal [on-line]. 7(3), 578-599.
- Özyurt, A. (2003). Job Satisfaction and Burnout Levels of İstanbul Physicians. İstanbul: Medical chamber, Golden Pirint Publisher.
- Piyal B., Çelen Ü., Şahin N. ve Piyal B. (2000). Job Satisfaction of Staff in Ankara University Faculty of Medicine Hospital. Ankara University Medical Faculty Journal. 53(4), 241-250
- Piyal, B. v.d., (2002). Social Insurance Institution Affecting Job Satisfaction of Staff in Ankara Training Hospital Agents. Journal of Crisis, Ankara. 10(1), 45-46.
- Schermerhorn, J. R. (2005), Management. Newyork: Wiley.
- Sünter A. T., Canbaz S., Dabak Ş., Öz H. Ve Pekşen Y. (2006). GPs in Physician Burnout, Work Related Stress and Job Satisfaction Levels. Journal of General Medicine. 16(1), 9-14.
- Şahin, S., Çek, F. ve Zeytin, N. (2011). Career satisfaction and dissatisfaction of Education Inspector. Journal of Theory and Practice in Educational Administration. 17(2), 221-24.
- Tanrıöğen, A. (1997). Buca Education Faculty Students' Attitudes towards the Teaching Profession. Journal of PAU Education Faculty. 3, 55.
- Taşdan M. ve Tiryaki E. (2008). Comparing private and the State Primary School Teacher Job Satisfaction Level. Journal of Education and Science. 33(147), 54-70.
- Telef, B. B. (2011). Self-efficacy of teachers , Job Satisfaction , Study of Life Satisfaction and Burnout İlköğretim Online, 10(1), 91-108.
- Tözün, M., Çulhacı, A. ve Ünsal, A. (2008). The Job Satisfaction of Physicians That Working in Primary Health Care Institutions in Family Medicine System (Eskişehir). TAF Preventive Medicine Bulletin. 7(5), 377-384.

- Yelboğa, A. (2007). Investigation of individual demographic variables of the Financial Sector Job Satisfaction Relations . Çağ University Journal of Social Sciences, 4(2), 1- 19.
- Yıldız N., Yolsal N., Ay P. ve Kıyan A. (2003). Employee Job Satisfaction in Istanbul Medical Faculty Physicians. İstanbul University Medical Faculty Journal. 66(1), 34-41.
- Yılmaz, A., ve Ceylan, Ç. B. (2011). The relationship between teachers ' job satisfaction levels with the leadership behaviors of primary school administrators. Educational Administration: Theory and Practice, 17(2), 277-394.
- Yılmaz, K. (2012). Relationships Between Organizational Citizenship Behaviors and Job Satisfaction Levels of Elementary School Teacher. Anadolu Journal of Educational Sciences. 2(2), 1.

Remote Experiment On Time Domain Phenomena In RLC Circuits And Their Characterization

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ABSTRACT

Knowledge of general RLC circuit is one of the basic block of physics lessons at high schools and lower levels of universities. To determine the values of the individual circuit components is in general not straightforward. In the paper we want to show, how the transient response of a RLC circuit may provide information enough for the circuit components determination.

First, we describe the basic properties of the RLC circuit and its mathematical description. Next, we focus on the created remote experiment for the elucidation of transient phenomena in the RLC circuit for the students. At the end of the paper we describe the workflow with the remote experiment in teaching process and show, how the parameters of the circuit may be determined from the measurements.

RLC CIRCUIT – PHYSICAL BACKGROUND

RLC circuit is an electrical circuit consisting of a resistor, an inductor and a capacitor connected in series or in parallel. Every letter in the name RLC stands for one of the usual symbols for the resistor, inductor and capacitor. The RLC circuit is always, in fact, a harmonic oscillator and resonates in a similar way as an ideal LC circuit without damping. The main difference is caused by the presence of the dissipative processes, which damp the current in a circuit. Because of that oscillations amplitude induced in the circuit decreases with the time after the voltage source is disconnected. Presence of the resistor in the circuit generally causes damping, and also affects the resonance frequency. In real circuits the presence of the resistance is unavoidable, even if the resistor is not included as a component of the circuit. A pure LC circuit is an idealized case, which exists only in theory.

There are many applications for this circuit. It is used in various types of electrical oscillators. Another important application is the tuning in a radio receivers or a television sets. It is used to select from the whole spectrum of signals a narrow range of frequencies we want. The RLC circuit can be also used as a band-pass filter, band-stop filter, low-pass filter or high-pass filter. The tuning application, for instance, is an example of band-pass filtering. The RLC filter is described as a second-order circuit; it means that any voltage or current in the circuit can be described by a second-order differential equation in the circuit analysis (Nilsson, 2011).

GENERAL EQUATION OF RLC CIRCUIT

$$i = \frac{dQ}{dt} \quad (1a)$$

$$Q = \int_{-\infty}^t i(\tau) d\tau \quad (1b)$$

$$v_R = Ri_R \quad (1a)$$

$$i_R = \frac{1}{R} v_R \quad (2b)$$

$$v_C = \frac{Q}{C} = \frac{1}{C} \int_{-\infty}^t i_C(\tau) d\tau \quad (3a)$$

$$i_C = C \frac{dv_C}{dt} \quad (3b)$$

$$v_L = L \frac{di_L}{dt} \quad (4a)$$

$$i_L = \frac{1}{L} \int_{-\infty}^t v_L(\tau) d\tau \quad (4b)$$

Time constant

$$\tau_{RL} = \frac{L}{R} \quad (5a)$$

$$\tau_{RC} = RC \quad (5b)$$

Natural frequency

$$\omega_0^2 = \frac{1}{LC} \quad (6)$$

SERIES RLC CIRCUIT

In a series RLC circuit passes the same current through the circuit components (see Figure 1), but the current through every component is identical and in general with different amplitude and phase shift with respect to voltage on it. The current through the resistor has zero phase shift with respect to the voltage on it, U_R . The current through the coil is behind the voltage U_L by -90° and that through capacitor is ahead of the voltage U_C by $+90^\circ$.

The same phase of the current and the voltage across the resistor is given by the properties of the resistor. There is no physical reason why the phase shift should occur, as there are no delays in the mechanism of conductive current, on which the resistor is based. With a coil and capacitor, the situation is different.

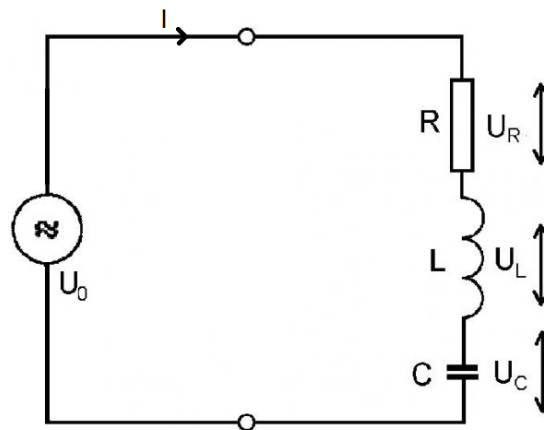


Figure 1. Serial RLC circuit

The current delay with respect to the voltage on the coil is caused by the electromagnetic induction effect in the coil, through which the time dependent current flows. By passing of this current the time dependent (i.e. non-stationary) magnetic field is created in the coil. The magnetic field changes create the induced voltage on the coil creating opposite current component. Consequently, the current starts passing through the coil with the opposite direction as the current which generates the magnetic field. The coil is trying to keep the original magnetic field, which it was there before it started to change, the phase shift of -90° results (Nilsson, 2011).

It is principle of Lenz's law:

An electric current, induced by a source such as a changing magnetic field, always creates a counterforce opposing the force inducing it ("Lenz' Law", 2005).

The overtaking of current due to the voltage on the capacitor is caused by periodic charging and discharging of the capacitor. It is charged in the first quarter of the AC period. When the capacitor voltage reaches the maximum value, the current through the capacitor is zero. Then the capacitor begins to discharge. It means that the voltage between the plates is gradually decreased and the current that flows through capacitor is increasing. When the current reaches its maximum (middle of the AC period), the capacitor is discharged and begins to charge in opposite polarity to the originally charged. The current gradually decreases until it reaches the zero value again. At that moment, the capacitor is charged to the maximum voltage but in opposite polarity as in first case. In the last quarter of the AC period, the capacitor is discharging and the current is increasing. Process just described is repeated periodically.

Due to described phase difference between voltage and current on the coil and capacitor the effective value of the resulting voltage in circuit can't be obtained by a simple arithmetic sum.

MATHEMATICAL BACKGROUND OF SERIES RLC CIRCUIT

From Kirchhoff's voltage law (KVL) we know that the net voltage (potential) change around a circuit is zero (Ciletti, 2004). You end up where you started.

$$v_L + v_R + v_C = v_s \quad (7)$$

Write in terms of the loop current i , (equations (2a), (3a), (4a)).

$$v_L = L \frac{di}{dt}; \quad v_R = Ri; \quad v_C = \frac{1}{C} \int_{-\infty}^t i(\tau) d\tau \quad (8)$$

Plug into (7)

$$L \frac{di}{dt} + Ri + \frac{1}{C} \int_{-\infty}^t i(\tau) d\tau = v_s \quad (9)$$

The integral is a problem so take the time derivative of every term in (9)

$$L \frac{d^2 i}{dt^2} + R \frac{di}{dt} + \frac{1}{C} i = \frac{dv_s}{dt} \quad (10)$$

Divide by L

$$\frac{d^2 i}{dt^2} + \frac{R}{L} \frac{di}{dt} + \frac{1}{LC} i = \frac{1}{L} \frac{dv_s}{dt} \quad (11)$$

Rewrite using equations (5a) and (6)

$$\frac{d^2 i}{dt^2} + \frac{1}{\tau_{RL}} \frac{di}{dt} + \omega_0^2 i = \frac{1}{L} \frac{dv_s}{dt} \quad (12)$$

Solution of eq. (12) is

$$u(t) = u(0) e^{-bt} \sin(\omega_1 t + \varphi) \quad (13)$$

Where

$$b = \frac{1}{2R_2 C} + \frac{R_1}{2L} \quad (14)$$

And

$$\omega_1^2 = \omega_0^2 - b^2 \quad (15)$$

PARALLEL RLC CIRCUIT

The physical background of activity of the parallel RLC circuit (see Figure 2) comes from the behavior of the resistor, inductor and capacitor in the AC circuit. This behavior was described above. The difference lies in the fact that the parallel connected circuit components have the same voltage, but different currents flows through them. Currents differ not only by value, but also by phases: current I_R flows through the resistor has the same phase as the voltage on the resistor, the coil current I_L is delayed compared to voltage by a quarter of period and the capacitor current I_C is overtaking by the quarter of period (Nilsson, 2011).

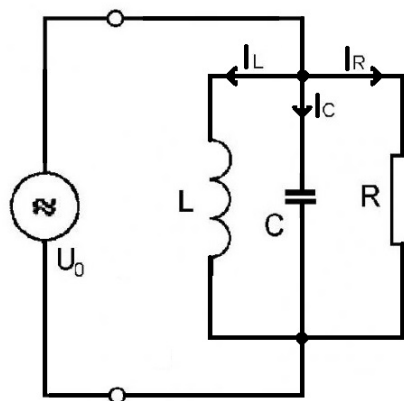


Figure 2. Parallel RLC circuit

MATHEMATICAL BACKGROUND OF PARALLEL RLC CIRCUIT

From Kirchhoff's current law (KCL) we know that the total current into a node equal the total current leaving the node (Ciletti, 2004). The electrons have to go somewhere.

$$i_{LC} + i_R = i_S; \quad i_L + i_C = i_{LC} \quad (16)$$

Combine to give

$$i_L + i_R + i_C = i_S \quad (17)$$

Write in terms of v , the voltage across all components:

$$i_L = \frac{1}{L} \int_{-\infty}^t V_L(\tau) d\tau; \quad i_R = \frac{1}{R} v_R; \quad i_C = C \frac{dv_C}{dt} \quad (18)$$

Plug into (14)

$$\frac{1}{L} \int_{-\infty}^t V_L(\tau) d\tau + \frac{1}{R} v_R + C \frac{dv_C}{dt} = i_S \quad (19)$$

The integral is a problem so take the time derivative of every term in (16). Reorder.

$$C \frac{d^2 v}{dt^2} + \frac{1}{R} \frac{dv}{dt} + \frac{1}{L} v = \frac{di_S}{dt} \quad (20)$$

Divide by C

$$\frac{d^2 v}{dt^2} + \frac{1}{RC} \frac{dv}{dt} + \frac{1}{LC} v = \frac{1}{C} \frac{di_S}{dt} \quad (21)$$

Rewrite using equations (5b) and (6)

$$\frac{d^2 v}{dt^2} + \frac{1}{\tau_{RC}} \frac{dv}{dt} + \omega_0^2 v = \frac{1}{C} \frac{di_S}{dt} \quad (22)$$

TRANSIENT PHENOMENON

A transient event is a short-lived burst of energy in a system caused by a sudden change of state. The source of the transient energy may be an internal or a nearby event. The energy then couples to other parts of the system, typically appearing as a short burst of oscillation. In electrical engineering, oscillation is an effect caused by a transient response of a circuit or system. It is a momentary event preceding the steady state (electronics) during a sudden change of a circuit. Mathematically, it can be modeled as a damped harmonic oscillator (Miliadis-Argitis, 1998).

An example of transient oscillation can be found in digital (pulse) signals in computer networks. Each pulse produces two transients, an oscillation resulting from the sudden rise in voltage and another oscillation from the sudden drop in voltage. This is generally considered an undesirable effect as it introduces variations in the high and low voltages of a signal, causing instability (Miliadis-Argitis, 1998).

From the previous paragraph it is obvious that it is necessary to cause a certain event to occur transient phenomena in the RLC circuit. This event may be a unit step voltage, which is admitted into the circuit. The RLC circuit starts to oscillate at the frequency of natural oscillations ω_0 . Electric and magnetic energy is transformed subsequently into the heat due to dissipative losses caused mostly by resistors. For this reason, there is a gradual attenuation of oscillations to a zero. The speed of this process is characterized by a damping factor.

This coefficient is dependent on the total resistance of the circuit and can be determined from the time dependence of the voltage drop amplitude on the circuit. There is a linear damping factor dependence of the damping factor on the value of serially connected resistor and the reciprocal dependence on the parallel resistor value. From these two dependencies the values of the components of the RLC series circuit can be derived. An example of the measured data evaluation is presented in section “Determination of circuit parameters”.

TRANSIENT IN RLC CIRCUIT AS A REMOTE EXPERIMENT

The remote experiment (RE) “Transient phenomena in electric oscillators”, accessible via the Remote Laboratory Management System (RLMS) REMLABNET has been built (<http://remlabnet.eu>). It is a real experiment running in a real laboratory by using real instruments and equipment (Schauer, 2014). It can be controlled by a teacher, student or any other user from his/her computer through the Internet on the general controlling scheme of server-client (Krbeček, 2013). Controlling of the experiments is enabled via Web interface, by means of which the user can perform the appropriate settings, options, and starting or stopping the experiment. The measured data from the experiment are transferred across the Internet and presented through the web interface to the client. The web page includes the option to export data directly into one of the spread sheets editor (most often Microsoft Excel) for easy processing. Experiment also includes the web camera that allows

monitoring of the on-going experiment in real time (Auer, 2009). The experiment is built, using the Internet School Experimental System (ISES) a powerful tool for the process and experiments control, acquisition, collecting and data processing in real time. Let us mention the basic features of the ISES system, more detailed description may be found elsewhere (Schauer, 2006). The basis of the system is ISES board, which is available in several versions, differing depending on the number of inputs/outputs and also on type of communication with the control PC (by PCI card, USB connector, Wi-Fi). To this board are plugged in ISES sensors like: ammeter, voltmeter, thermometer, position sensor, ohmmeter, load cell, anemometer, microphones, sonar, light gate, pH meter, conductivity meter, heart rate monitor, etc. (Schauer, 2006).

Due to its maximum signal transfer frequency (100 kHz) the system allows the study of dynamic signals like sound or electronic signals. The system allows simultaneous measurement, processing and displaying data via maximum eight input channels, as well as process control via two analogue and two binary output channels. But the uniqueness of this system is its possibility of using the same equipment both for experiments in the laboratory (so-called hands on experiments) and also for their remote versions - remote experiments (Schauer, 2006).

The RE "Transient phenomena in electric RLC oscillators" is designed for the measuring the transient responses with changing the damping resistors, series and parallel, respectively. The RE does not provide detailed processing of the measured transient responses, but allows the export of measured data for the external processing. Experiment is composed from RLC components and is connected to a DC voltage source (see Figure 3). There is the ISES V-meter and ISES A-meter, measuring the transient voltage /current, respectively. Another part of the experiment is a relay board, which contains 16 of controllable relays. One of them is used for creation of the unit step voltage. Other relays allow connecting serial and parallel resistors to the circuit (10 for serial and 10 for parallel resistors). These resistors change the response to the unit step voltage, both on the series or parallel resistor, changing the damping factor b . The dependence of the damping factor on the value of both resistors we can determine circuit components values of L , C and R_L . Schematic diagram of the experiment is shown in Figure 3.

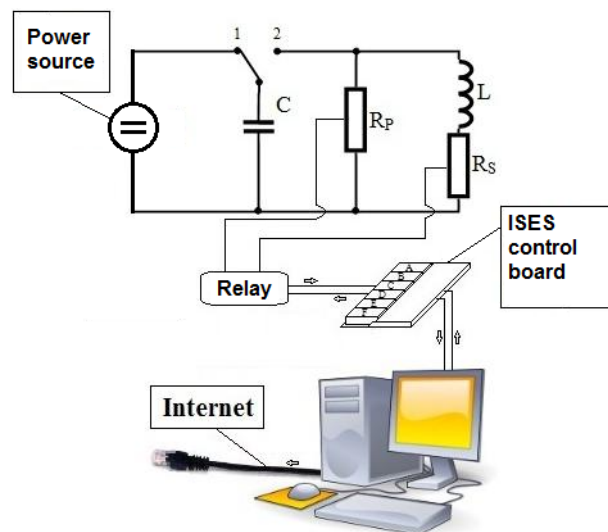


Figure 3. Schematic arrangement of RE

The control page of the RE is shown in Figure 4. On the right side of the page there is a window with an actual view of the experiment and the scheme of experiment. On the left side of the web page there are the controls of the experiment. The first group of controls elements (upper part) is used for the setting of the serial resistance. It consists of the display, which shows the adjusted resistance and the buttons serve for their adjusting. Below is the similar group of controls for adjusting the parallel resistors. Below it is a "Start" button by which the experiment is started. The remaining part of the control page is occupied by graphs of both measured quantities – voltage and current. In the bottom there are buttons for the export in two typical formats.

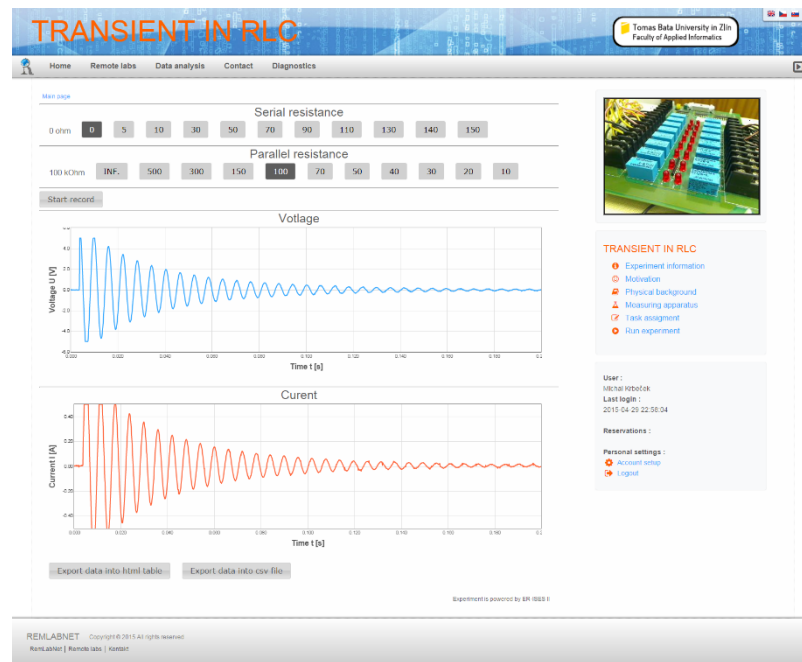


Figure 4. Control web page of remote experiment

DETERMINATION OF CIRCUIT PARAMETERS

Let us present the set of measurements with the goal to determine the RL L and C components of this series RLC circuit using artificial inserted damping.

SERIAL RESISTANCE

For the serial resistance the following values were measured:

$R [\Omega]$	$b [s^{-1}]$
0	33.4
10	38.2
20	41.8
30	44.4
40	46.3
50	54.7
60	61.4
70	63.5
80	71.5
90	72.1
100	79.6
110	83.878
120	87.090

Table 1. Values for serial resistance

Following graph (Figure 5.) shows the data from Table 1. Data were fitted by a linear approximation with the corresponding regression equation.

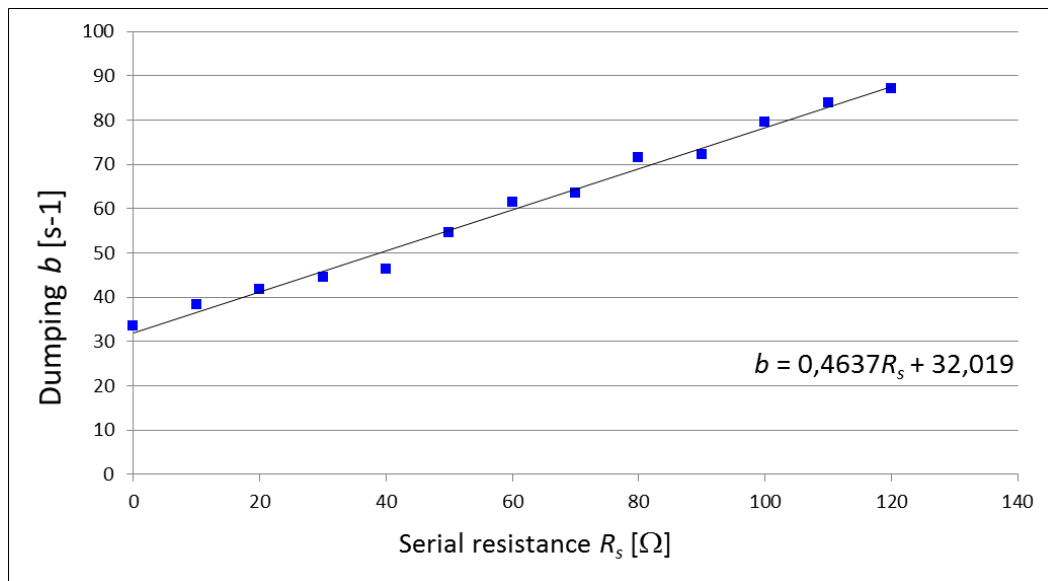


Figure 5. Dependence of damping coefficient and serial resistance

Parameters of coil can be obtained from the coefficients of the linear regression of the dependence $b = b(R_s)$, based on eq.

$$b = \frac{R_s}{2L}, \quad (24)$$

And found:

$$b = a + c R_s, \quad a = 32.019 \text{ s}^{-1} (\Omega \text{ H}^{-1}), \quad c = 0.4637 \text{ s}^{-1} \Omega^{-1} (\text{or H}^{-1}) \quad (25)$$

$$c = \frac{1}{2L} \Rightarrow L = \frac{1}{2c} \quad a = \frac{R_L}{2L} \Rightarrow R_L = a2L \quad (26)$$

$$L = \frac{1}{2 \cdot 0,4637} = 1.07 \text{ H}; \quad R_L = 32.019 \cdot 2 \cdot 1.07 = 69.1 \Omega$$

PARALLEL RESISTANCE

For the parallel resistance the following values were measured:

R [kΩ]	b [s-1]
10	79.4
20	51.0
30	43.8
40	40.1
50	39.4
60	38.0
70	35.8
80	35.5
90	35.7
100	35.2
110	33.8
120	33.5
130	34.5

Table 2. Values for parallel resistance

Following graph (Figure 6) shows the data from Table 2. Data were fitted by a linear approximation with the corresponding regression equation.

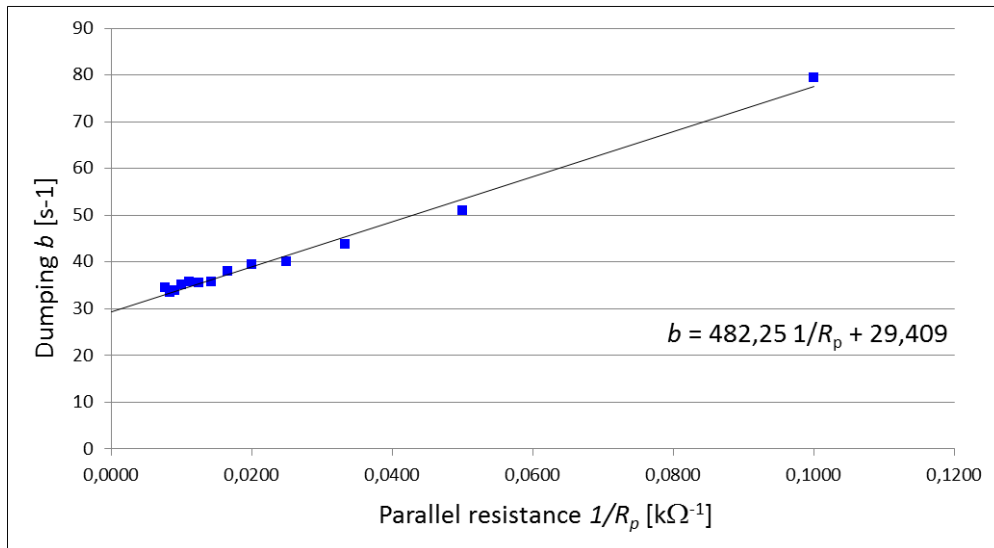


Figure 6. Dependence of damping coefficient and parallel resistance

Parameters of capacitor can be obtained from the coefficients of the linear regression equation:

$$b = a + c \cdot 1/R_p \quad (27)$$

$$b = \frac{1}{2RC} \quad a = 32.019 s^{-1}, \quad c = 0.4637 F^{-1} \quad (28)$$

$$c = \frac{1}{2C} \Rightarrow C = \frac{1}{2c} \quad a = \frac{1}{2CR_C} \Rightarrow R_C = \frac{1}{a2C} \quad (29)$$

$$C = \frac{1}{2 \cdot 482272} = 1.04 \cdot 10^{-6} F$$

$$R_C = \frac{1}{29.409 \cdot 2 \cdot 1.04 \cdot 10^{-6}} = 163.5 k\Omega$$

CONCLUSIONS

Paper was focused on the RE for the study of the RLC circuit in the time domain and the assignment was to determine by the measurements the parameters of the RLC circuit components by the measuring of the transient phenomena.

The transient response occurs as the response to the step voltage. Value of the damping coefficient of the circuit varies depending on the artificial damping, inserted by external resistances. By changing the damping and finding the dependences $b=b(R_s)$ and $b=b(R_p)$ we may, based on the theoretical dependence, to determine the values of all the circuit components of the resistor R, inductor L and capacitor C of the circuit and also internal resistance of the inductor RL.

For obtaining the real data, the remote experiment “Transient phenomena in electric RLC oscillators“ was constructed. It allows the recording in the graphs and export of the corresponding data of both instantaneous voltage and current time dependences for subsequent processing.

All outputs from this paper will be used in the lessons of physics at the Faculty of Applied Informatics of Tomas Bata University in Zlín

References

- Auer, M., & Gravier, C. (n.d.). Guest Editorial: The Many Facets of Remote Laboratories in Online Engineering Education. *IEEE Trans. Learning Technol. IEEE Transactions on Learning Technologies*, 260-262.
- Schauer, F., Kuřitka, I., & Lustig, F. (2006). Creative laboratory experiments for basic physics using computer data collection and evaluation exemplified on the intelligent school experimental system (ISES). In W. Aung (Ed.), *Innovations 2006: World innovations in engineering education and research*. Arlington, VA: INEER/Begell House Pub.

- Ciletti, M. (2004). RL, RC, and RLC Circuits. *The Engineering Handbook, Second Edition Electrical Engineering Handbook*.
- Krbeček, M., Schauer, F., & Jašek, R. (2013). Security Aspects of Remote e-Laboratories. *Int. J. Onl. Eng. International Journal of Online Engineering (iJOE)*, 34-34.
- Lenz' Law. (2005). *Van Nostrand's Scientific Encyclopedia*.
- Miliadis-Argitis, J. (1998). Transient phenomena of RLC circuits - The photovoltaic input. *Solar Energy Materials and Solar Cells*, 363-378.
- Nilsson, J., & Riedel, S. (2011). *Electric circuits* (9th ed.). Boston: Prentice Hall.
- Schauer, F., Krbecek, M., Beno, P., Gerza, M., Palka, L., & Spilakova, P. (2014). REMLABNET - open remote laboratory management system for e-experiments. *2014 11th International Conference on Remote Engineering and Virtual Instrumentation (REV)*.

School Self-Concept Of Adolescents Aged 10-15 In Slovakia And In Czech Republic. Comparative Study

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ABSTRACT

The contribution is focused on the school self-concept of adolescents. The school self-concept is very important psychological and educational problem because of the relation between the self-concept and school performance and because of the relatively low count of the relevant diagnostics methods. The comparative study is based on the data from Slovak and Czech adolescents aged 10-15 and is the result of the research cooperation between the Department of Psychology (Faculty of Arts, Palacký University Olomouc) and Department of Educational and School Psychology (Faculty of Education, Constantine the Philosopher University in Nitra). We assumed that there exists the difference between the Slovak and Czech population in the school self-concept. Our research sample consists of approximately 5 900 adolescents (4 200 Czech and 1 700 Slovak adolescents). As a research method we used the SPAS (Student's Perception of Ability Scale), concretely version III which was standardized in Slovakia and in Czech Republic by Matějček and Vágnerová in 1992, named as Questionnaire of Children's School Self-Concept. Because of the age of the standardization we modernized the method through the item reformulations and formal design of the method. As a general result we acquired no significant difference in between the Slovak and Czech adolescents in global school self-concept and we can't accept our assumption. Hereby we realized the gender and age comparisons which are a part of our contribution.

Key words: adolescence, school self-concept, SPAS, comparative study

INTRODUCTION

General self-concept

Self-concept represents a psychological concept which is native to Psychology right from its founding. It is already related to James, who perceives the human psychic as a dual entity, consisting of a pure Self and empirical Self (Blatný, 2001). Baumeister (2005) defines the self-concept as a complex of individual beliefs about one-self which consists of personal attributions about what the self is.

Self-concept is a factor which influences the psychical regulation, orientation and stability of activity (Balcar, 1983) and indirectly influences through ideal Self, self-esteem, self-evaluation or self-efficacy. Its unidirectional influence is given by the traditional structure which has its cognitive, affective and conative character (Greenwald, Pratkanis, 1984).

The cognitive aspect of the self-concept is based on the assumption that there exists the declarative and procedural knowledge about the self. This knowledge represents the content of the self and the processes of the self, which were named by Greenwald (1980) as beneficence and effectance. These two words were joined to the term benefectance. The cognitive aspect of the self is also represented by the various hypothetical form of self, for example ought self (Higgins, 1987), undesired self (Ogilvie, 1987), ideal self (Rogers, 1951), possible selves (Markus, Nurius, 1986) etc.

The emotional aspect of the self is mainly connected with the components named as self-competence and self-liking (Tafarodi, Swann, 1995). Self-competence expresses the personal belief about the ability to produce the desired outcomes. Self-liking expresses the perception of the social relations and their influence on the self-perception. These terms express two sources of the emotional aspect of the self-concept – inner and outer.

The conative aspect of the self-concept can be derived from the Higgins's theory of self-discrepancy (Higgins, 1991), specially the concept of the self-guides, and the concept of the self-mastery (Bandura, 1997). The self-guides are life standards which belong to the content of the ideal and ought self. They motivate the behaviour and give it the emotional charge. Motivated behaviour leads to the comparison between the actual and desired state. The result can be the consistency or the inconsistency. The consistency expresses the desired behaviour and the inconsistency expresses the undesired behaviour which has to be changed.

We can summarize that the self-concept, a hypothetical mental structure, which (1) has a cognitive, affective and conative element, (2) is derived from social experience represented mainly by the closest relationships, (3) issues

from the human activity and need of self-definition, (4) is derived from the ability to perceive the requirements of outer environment and internalize subjectively transformed contents of these expectations, (5) has more forms which function is the regulation and stabilization of behaviour, as well as interpretation of specific experience in a particular context.

We can also define some characteristics of the general self-concept. According to Shavelson et al. (1976), the self-concept is: (1) organized and structured, (2) multifaceted in the concordance with the category system individual interpretation of the group categories, (3) hierarchical, based on the moving to inferences about the self in subareas (academic and non-academic), (4) relatively stable, but dependent on the specific situations and consequences of the behaviour, (5) multifaceted in the relation with the increasing age, (6) descriptive and evaluating, (7) differentiated from the other personality constructs.

Academic Self-Concept

At this moment we come to the thought to what extent perception of ourselves is influenced by the perception of us by other people. Matějček, Vágnerová et al. (2006) write about personal and social basis of self-evaluation. Personality basis is based on comparison of own abilities with one another. Social basis is established on comparison of own abilities with the abilities of others (which are similar to the person in age, gender, etc.). Another specific category of formative social influences represent reactions of reference persons, who are parents and teachers in the child age. Their tendencies to identify the causes of successes/failures at school, satisfaction/dissatisfaction with school results, emotion reactions related to school performance, possible discrepancies and conflicts between parents and teachers significantly influence child's self-constructs and his/her self-confidence.

Self-concept is a variable which is dependent on individually specific concordance of various factors (according to Matějček, Vágnerová et al., 2006), like personal characteristics, stability and integration of personality, frustration tolerance, emotional support of close ones, social positions in peer groups, etc. Undoubtedly, it is dependent also on emotional experience, or emotional resilience (Matějček, Vágnerová et al., 2006) residing in the ability to deal with negative emotions (anxiety, fear, doubt, sadness, shame, guilt) which can occur by performance that is not adequate to child's abilities and it can influence his/her further aspirations, interest for work, attitude towards work, motivation in general and from the point of interpretation of own performance also the attitude towards oneself, mirroring into self-evaluation. Emotions in pre-school and school age strongly influence child's performance and so represent a mediator which catalyses circular character of regulation-interpretation system of perception, own competence.

Basal personality structures, to which self-evaluation also belongs, represent generalized beliefs which were created based on a bigger or lower number of experiences with a specific occurrence. In case of self-evaluation we could speak about the ability to produce the expected performance. It is nevertheless not fixed to any specific situation in a child's age, or environment which would explicitly control the development of abilities. The situation changes after a child enters the school. Based on the confrontation with school environment and its requirements, self-evaluation as a generalized belief is formed into specific element in the form of school self-concept (Matějček, Vágnerová et al., 2006). Formation of school self-concept is dependent on the development of cognitive functions like it is specific for a specific development stages.

Children who have just entered the school are not able to differentiate their own abilities and abilities of other children yet. They are fully dependent on the opinion of teachers and parents. In the school age, expectations and requirements of adults represent a norm of required behaviour which the children transform into normative ideas about themselves (self-concept). They try to identify with this idea and fulfil it (Poledňová, Stránska, Kmětíková, 2009). In the second or third grade of primary school the children already realize that different persons have different abilities and are able to fulfil different tasks than others. However, they are not able to generalize this experience yet. Around their 10th year the children can already evaluate their own abilities in a more complex and integrated way. The child becomes aware of differences from others and his/her self-evaluation is more durable against outer influences. In pubescence comes to decrease of self-evaluation, children are more unstable, less self-confident. The self-confidence wouldn't change in this period in spite of the possible deviations caused by actual events in the life of pubescent person (according to Vágnerová, Klégrová, 2008).

All these processes related to the ontogenetic development are strongly connected to the development of the school, or more precisely to an academic self-concept. It is demanding to design the model of the academic self-concept within some research. At least three important models can be identified in the history of this problem.

The Shavelson model (Shavelson et al., 1976) is based on the influence of the academic self-concept on the main areas of the school subjects – Math self-concept, Science self-concept, History self-concept, English self-concept.

The Marsch model (Marsch et al., 1985), first-order model assumes the multilateral relations between the main domains of the academic self-concept – Math self-concept, Physical Science self-concept, Foreign Language self-concept, English self-concept.

The Marsch/Shavelson model (Marsch, 1990), higher-order factor model, distinguishes the Mathematics self-

concept and the Verbal self-concept which can be considered to be uncorrelated. Marsch (1990) assumed the Mathematics self-concept influences the Math self-concept, Physical Science self-concept, Biological Science self-concept, Economics Business self-concept, Academic self-concept and partially Geography self-concept and History self-concept. Marsch (1990) assumed the Verbal self-concept influences English self-concept, Foreign Language self-concept, History self-concept, Geography self-concept, Academic self-concept and partially Economics Business self-concept and Biological Science self-concept.

All these models are very important for understanding of the academic self-concept. Especially, the third one looks very effective one (according to results of Brunner et al., 2009).

We have to note that in the process of the general self-concept development and academic self-concept development there is very important to regard also on the non-academic self-concept. It consists of the social self-concept, emotional self-concept, physical self-concept and it is determined by the relations with peers, significant others, particular emotional states, physical ability and physical appearance (Shavelson et al., 1976).

THE STUDY

The research sample

The research sample consists of 1 704 Slovak adolescents in the age from 10 to 15 and 4 183 Czech adolescents in the age from 11 to 15. The total amount of the research sample was 5 887.

The Slovak research data were acquired in 5th, 6th, 7th, 8th and 9th grades of primary schools and in 1st, 2nd, 3rd, 4th grades of the eight-years grammar school in all districts of the Slovak Republic, except Bratislava's district, it means 7 districts. The average age of the pupils was 12.45 years old with standard deviation 1.50 year old. The amount of the boys and girls was relatively balanced (837 boys and 867 girls).

The Czech research data were acquired in 6th, 7th, 8th and 9th grades of primary schools and in 1st, 2nd, 3rd, 4th grades of the eight-years grammar school in all districts of the Czech Republic, it means 14 districts. The average age of the pupils was 13.00 years old with standard deviation 1.25 year old. The amount of the boys and girls was relatively balanced (2 004 boys and 2 179 girls).

Both research samples were representative. The total amount of the pupils of the school age were 230 531 in the Slovak Republic and 348 678 in the Czech Republic in 2014.

The research method

We have chosen the Questionnaire of Children's School Self-Concept. It is standardized method published in 1992 (Matějček, Vágnerová 1992). It consists of 48 items which are agreed or disagreed by the respondents. The questionnaire contains of six scales saturated by eight items: General Abilities, Mathematics, Reading, Spelling, Writing, Self-Confidence. It is also possible to calculate the total score of the school self-concept.

The possible range of the point is from 0 to 8 in the subscales. The total score is the range from 0 to 48. The score can be standardised into the stens.

The questionnaire was created as a Czech, respectively Czechoslovak modification of the questionnaire SPAS (Student's Perception of Ability Scale) from F.J. Boersma and J.W. Chapman (1979 in Matějček, Vágnerová, 1992). It was modified into the SPAS III form in 1987. The reliability of the subscale measured by Cronbach α is 0.89 and more. Our measurements in 2014 showed the Cronbach α in the range from 0.70 to 0.86.

The research hypotheses

We hypothesized that:

- H1: there exists the difference between the Slovak and Czech adolescents in the school self-concept.
- H2: there exists the difference in the school self-concept in the relation to the age of the adolescents.
- H3: there exists the difference in the school self-concept in the relation to the gender of the adolescents.

FINDINGS

We applied Statistical Program for Social Science 20.0 while testing hypotheses. As a statistical method, we applied t-test and ANOVA. We consider a standard level of significance $\alpha \leq 0.05$ which points to significant differences among research groups.

Results of analysis are displayed in Tables 1-15. In the table 1, there is the general comparison of the school self-concept in both the Slovak and Czech research samples. In the table 2-8 there are the comparisons of the school self-concept in both the Slovak and Czech research samples according to age. In the table 9-15 there are the comparisons of the school self-concept in the Slovak and Czech research sample according to gender.

Table 1 The comparison of School Self-Concept subscales in the Slovak and Czech research samples

			N	M	SD	t	p
SPAS	General Abilities	CR	4 148	3.66	2.169	0.787	0.431
		SR	1 646	3.71	2.211		
	Mathematics	CR	4 148	4.39	2.328	6.230	0.001
		SR	1 633	4.81	2.241		
	Reading	CR	4 148	5.51	2.480	0.281	0.779
		SR	1 631	5.49	2.332		
	Spelling	CR	4 148	4.22	2.799	1.126	0.365
		SR	1 656	4.13	2.726		
	Writing	CR	4 148	4.64	2.531	0.000	1.000
		SR	1 638	4.64	2.437		
	Self-Confidence	CR	4 148	3.97	2.222	0.620	0.535
		SR	1 630	4.01	2.170		
	Self-Concept	CR	4 133	26.41	9.421	1.697	0.089
		SR	1 454	26.90	9.613		

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 2 The comparison of General abilities subscale in the Slovak and Czech research samples according to age

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	General abilities	10 years old	194	3.95	2.144	-	-	-	-	-
		11 years old	272	3.88	2.175	577	3.95	2.170	0.438	0.661
		12 years old	354	3.53	2.154	964	3.74	2.115	1.589	0.112
		13 years old	354	3.79	2.290	1 028	3.57	2.200	1.605	0.108
		14 years old	330	3.71	2.257	1 077	3.59	2.213	0.857	0.391
		15 years old	142	3.32	2.089	507	3.57	2.108	1.251	0.211

F = 2.261 p = 0.046 F = 3.976 p = 0.003

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; F = F-value; p = significance

Table 3 The comparison of Mathematics subscale in the Slovak and Czech research samples according to age

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Mathematics	10 years old	199	5.66	2.006	-	-	-	-	-
		11 years old	268	5.46	2.072	582	5.26	2.281	1.221	0.222
		12 years old	349	4.68	2.275	964	4.74	2.277	0.421	0.673
		13 years old	354	4.67	2.223	1 028	4.31	2.314	2.549	0.011
		14 years old	321	4.35	2.177	1 083	3.98	2.277	2.582	0.009
		15 years old	142	4.04	2.301	506	3.81	2.247	1.072	0.284

F = 17.867 p < 0.001 F = 44.266 p < 0.001

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; F = F-value; p = significance

Table 4 The comparison of Reading subscale in the Slovak and Czech research samples according to age

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Reading	10 years old	196	5.36	2.353	-	-	-	-	-
		11 years old	267	5.33	2.404	581	5.60	2.438	1.504	0.132
		12 years old	349	5.30	2.307	963	5.67	2.428	2.471	0.014
		13 years old	347	5.72	2.293	1 029	5.41	2.506	2.035	0.042
		14 years old	328	5.70	2.298	1 084	5.49	2.467	1.372	0.170
		15 years	144	5.35	2.355	507	5.38	2.530	0.127	0.898

F = 2.138 p = 0.058 F = 2.075 p = 0.081

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; F = F-value; p = significance

Table 5 The comparison of Spelling subscale in the Slovak and Czech research samples according to age

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Spelling	10 years old	196	4.95	2.521	-	-	-	-	-
		11 years old	275	4.44	2.696	581	4.38	2.750	0.300	0.764
		12 years old	356	3.90	2.641	966	4.29	2.758	2.306	0.021
		13 years old	354	3.94	2.753	1 027	4.06	2.831	0.692	0.488
		14 years old	330	3.86	2.836	1 084	4.20	2.810	1.920	0.055
		15 years old	145	4.03	2.749	508	4.33	2.804	1.141	0.254

F = 5.845 p < 0.001 F = 1.693 p 0.149

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; F = F-value; p = significance

Table 6 The comparison of Writing subscale in the Slovak and Czech research samples according to age

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Writing	10 years old	196	4.89	2.406	-	-	-	-	-
		11 years old	267	4.80	2.389	581	4.75	2.566	0.269	0.787
		12 years old	355	4.70	2.433	965	4.81	2.515	0.711	0.477
		13 years old	351	4.46	2.415	1028	4.58	2.510	0.781	0.435
		14 years old	328	4.73	2.366	1084	4.56	2.498	1.093	0.274
		15 years old	141	4.05	2.479	507	4.59	2.544	2.241	0.025

F = 2.889 p = 0.013 F = 1.842 p = 0.118

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; F = F-value; p = significance

Table 7 The comparison of Self-Confidence subscale in the Slovak and Czech research samples according to age

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Self-Confidence	10 years old	191	4.58	1.931	-	-	-	-	-
		11 years old	271	4.37	2.079	578	4.50	2.125	0.836	0.403
		12 years old	351	3.81	2.154	965	4.23	2.177	3.103	0.002
		13 years old	347	4.02	2.177	1 027	3.90	2.226	0.873	0.382
		14 years old	329	3.83	2.253	1 082	3.66	2.225	1.210	0.226
		15 years old	141	3.43	2.262	505	3.71	2.172	1.341	0.180

F = 7.287 p < 0.001 F = 19.195 p < 0.001

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; F = F-value; p = significance

Table 8 The comparison of School Self-Concept in the Slovak and Czech research samples according to age

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Self-Concept	10 years old	167	28.96	9.038	-	-	-	-	-
		11 years old	231	28.45	10.244	571	28.40	9.319	0.066	0.946
		12 years old	311	26.29	9.471	961	27.50	9.485	1.956	0.051
		13 years old	318	26.97	9.358	1 022	25.82	9.606	1.875	0.061
		14 years old	296	26.16	9.697	1 073	25.45	9.218	1.159	0.246
		15 years old	131	24.50	9.188	502	25.38	8.919	0.999	0.318

F = 5.042 p < 0.001 F = 15. 039 p < 0.001

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; F = F-value; p = significance

Table 9 The comparison of General abilities subscale in the Slovak and Czech research samples according to gender

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	General abilities	boys	802	3.68	2.202	1 988	3.72	2.189	0.436	0.662
		girls	842	3.74	2.208	2 169	3.62	2.155	1.362	0.173

t = 0.587 p = 0.557 t = 1.558 p = 0.119

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 10 The comparison of Mathematics subscale in the Slovak and Czech research samples according to gender

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Mathematics	boys	793	4.92	2.234	1 995	4.74	2.311	1.872	0.061
		girls	838	4.69	2.239	2 172	4.08	2.303	6.564	< 0.001

t = 2.085 p = 0.037 t = 9.037 p < 0.001

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 11 The comparison of Reading subscale in the Slovak and Czech research samples according to gender

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Reading	boys	793	5.14	2.350	1 994	5.22	2.456	0.785	0.432
		girls	836	5.82	2.267	2 174	5.78	2.461	0.408	0.683

t = 5.982 p < 0.001 t = 7.154 p = 0.001

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 12 The comparison of Spelling subscale in the Slovak and Czech research samples according to gender

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Spelling	boys	805	3.44	2.610	1 995	3.64	2.727	1.778	0.075
		girls	849	4.78	2.680	2 175	4.77	2.751	0.090	0.927

t = 10.293 p < 0.001 t = 13.449 p < 0.001

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 13 The comparison of Writing subscale in the Slovak and Czech research samples according to gender

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Writing	boys	797	3.87	2.310	1 993	3.61	2.352	2.651	0.008
		girls	839	5.37	2.286	2 176	5.60	2.283	2.478	0.013

$$t = 13.242 \quad p < 0.001 \quad t = 27.701 \quad p < 0.001$$

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 14 The comparison of Self-Confidence subscale in the Slovak and Czech research samples according to gender

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Self-Confidence	boys	788	3.94	2.153	1 989	3.95	2.242	0.107	0.914
		girls	840	4.07	2.192	2 172	4.00	2.187	0.788	0.431

$$t = 1.296 \quad p = 0.195 \quad t = 0.569 \quad p = 0.560$$

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; p = significance

Table 15 The comparison of School Self-Concept in the Slovak and Czech research samples according to gender

			SR			CR			t	p
			N	M	SD	N	M	SD		
SPAS	Self-Concept	boys	699	24.92	9.266	1 975	24.85	9.361	0.170	0.864
		girls	753	28.73	9.564	2 158	27.84	9.247	2.253	0.024

$$t = 7.700 \quad p < 0.001 \quad t = 10.308 \quad p < 0.001$$

Legend: CR = Czech Republic; SR = Slovak Republic; N = count; M = mean; SD = standard deviation; t = t-value; p = significance

We found out:

- the only one significant difference between the Slovak and the Czech adolescents in the school self-concept. Particularly, it is the difference ($t = 6.230$; $p = 0.001$) in the subscale Mathematics (table 1).
- the difference in General abilities subscale in the Slovak sample ($F = 2.261$; $p = 0.046$) and in the Czech sample ($F = 3.976$; $p = 0.003$) according to age. The differences between the countries are not significant (table 2).
- the difference in Mathematics subscale in the Slovak sample ($F = 17.867$; $p < 0.001$) and in the Czech sample ($F = 44.266$; $p < 0.001$) according to age. The comparison of the countries showed the difference only in the group of 13 ($t = 2.254$; $p = 0.011$) and 14 years old adolescents ($t = 2.282$; $p = 0.009$) (table 3).
- no significant difference in Reading subscale in the Slovak sample and in the Czech sample according to age. The comparison of the countries showed the difference only in the group of 12 ($t = 2.471$; $p = 0.014$) and 13 years old adolescents ($t = 2.035$; $p = 0.042$) (table 4).
- the difference in Spelling subscale in the Slovak sample ($F = 5.845$; $p < 0.001$) according to age. The comparison of the countries showed the difference only in the group of 12 years old adolescents ($t = 2.306$; $p = 0.021$) (table 5).
- the difference in Writing subscale in the Slovak sample ($F = 2.889$; $p = 0.013$) according to age. The comparison of the countries showed the difference only in the group of 15 years old adolescents ($t = 2.241$; $p = 0.025$) (table 6).
- the difference in Self-Confidence subscale in the Slovak sample ($F = 7.287$; $p < 0.001$) and in the Czech sample ($F = 19.195$; $p < 0.001$) according to age. The comparison of the countries showed the difference only in the group of 12 years old adolescents ($t = 3.103$; $p = 0.002$) (table 7).
- the difference in the total score of the school self-concept in the Slovak sample ($F = 5.042$; $p < 0.001$) and in the Czech sample ($F = 15.039$; $p < 0.001$) according to age. The differences between the countries are not significant (table 8).
- no significant difference in Reading subscale in the Slovak sample and in the Czech sample according to gender. The differences between the countries are not significant (table 9).
- the difference in Mathematics subscale in the Slovak sample ($t = 2.085$; $p = 0.037$) and in the Czech sample ($t = 9.037$; $p < 0.001$) according to gender. The comparison of the countries showed the difference between the Slovak and Czech girls ($t = 6.564$; $p < 0.001$) (table 10).

- the difference in Reading subscale in the Slovak sample ($t = 5.982$; $p < 0.001$) and in the Czech sample ($t = 7.154$; $p = 0.001$) according to gender. The differences between the countries are not significant (table 11).
- the difference in Spelling subscale in the Slovak sample ($t = 10.293$; $p < 0.001$) and in the Czech sample ($t = 13.449$; $p < 0.001$) according to gender. The differences between the countries are not significant (table 12).
- the difference in Writing subscale in the Slovak sample ($t = 13.242$; $p < 0.001$) and in the Czech sample ($t = 27.701$; $p < 0.001$) according to gender. The comparison of the countries showed the difference between the Slovak and Czech boys ($t = 2.651$; $p = 0.008$) and girls ($t = 2.487$; $p < 0.013$) (table 13).
- no significant difference in Self-Confidence subscale in the Slovak sample and in the Czech sample according to gender. The differences between the countries are not significant (table 14).
- the difference in the total score of the school self-concept in the Slovak sample ($t = 7.700$; $p < 0.001$) and in the Czech sample ($t = 10.308$; $p < 0.001$) according to gender. The comparison of the countries showed the difference between the Slovak and Czech girls ($t = 2.253$; $p = 0.024$) (table 15).

CONCLUSIONS

We can't accept our hypotheses because of the results which are not clear. But in our findings there are some partial results which we want to comment.

The school self-concept of the Slovak and Czech adolescents are very similar according to average mean and variability of the data represented by standard deviation. The self-evaluation of the abilities in Mathematics is the only significant difference in the global comparison. The partial differences between the Slovak and Czech adolescents were found in Mathematics in the group of 13 and 14 years old and the in group of girls, Reading in the group of 12 and 13 years old, Spelling in the group of 12 years old, Writing in the group of 15 years old and in the group of the boys and girls, Self-confidence in the group of 12 years old, Self-concept in the group of girls. These are some partial differences between the countries.

More important are the differences which we acquired within the countries in the relation to age and gender. We found that the believes about general abilities (both countries), about abilities in Mathematics (both countries), about the abilities in Spelling (Slovak Republic), about the abilities in Writing (Slovak Republic), about the Self-confidence are decreasing in the relation to increasing age.

Further we found that the believes about abilities in Reading, about abilities in Spelling, about abilities in Writing, about Self-confidence, and the Self-concept are higher in the group of girls (both countries). The believes about abilities in Mathematics are higher in the group of boys (both countries).

These findings are important in the relation to educational psychology and teaching. The decreasing of the school self-concept can be connected with out-of-intellect factors, especially the motivation of the pupils and the class atmosphere. So the challenge for the teachers and the parents of the pupils is the motivational aspects of the education and the support of the healthy relations in the class and in the school. We know the school achievement in the main subjects is decreasing with the increasing age (Matějček, 2011) and that the attitude to the school is declining with the increasing age. And these findings may be the risk factors which can lead to production of the problem behaviour in the adolescence. The support of the emotional and cognitive motivation, creation of the human and democratic school environment can be in the relation to the self-regulation and autonomy support the way of the prevention of the problem behavior.

The gender difference described in the text above showed the stereotypical reinforcement of the boys' believes about their abilities in Mathematics representing technical thinking despite of the fact the girls achieve better results than boys in Mathematics and the other subjects in general in the Slovak Republic. This is the proclamation of that the girls' effort to learn something is not supported by teachers and that the hidden curriculum can be also the specific factor which can demotivate the pupils, in this case the girls, to try to develop own personality according to personal goals. The formative influences reflecting the decreasing of the school self-concept certainly have the impact on the general self-concept which is also decreasing and can be connected with characteristics as helplessness, amotivation, alexithymia, depression, anxiety, loss of the life meaning, hostility, incompetency, deregulation of the behaviour etc.

References

- Balcar, K. (1983). *Úvod do studia psychologie osobnosti*, Praha: SPN.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), pp. 191-215.
- Blatný, M. (2001). *Sebepojetí v osobnostním kontextu*, Brno: Masarykova univerzita.
- Baumeister, R.F. (2005). Self-concept, self-esteem and identity. In V.J. Derlega, B.A. Winstead, W.H. Jones. (Eds.) *Personality: Contemporary theory and research* (pp. 246-280). Toronto: Thoomson Wadsworth.
- Brunner, M., Keller, U., Hornung, C., Reichert, M., & Martin, R. (2009). The cross-cultural generalizability of a new structural model of academic self-concepts. *Learning and Individual Differences*, 19, pp. 387-403.
- Greenwald, A.G. (1980). The totalitarian ego: Fabrication and revision of personal history. *American*

Psychologist, 35(7), pp. 603-618.

Greenwald, A.G., & Pratkanis, A.R. (1984). The self. In R.S. Wyer, T.H. Srull (Eds.) *Handbook of social cognition* (pp. 129-178). Hillsdale, N.J.: Erlbaum,.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, 41 (9), pp. 954-969.

Marsch, H.W. (1990). The structure of academic self-concept: The Marsch/Shavelson model. *Journal of Educational Psychology*, 82, pp. 623-636.

Marsch, H.W., Smith, I.D., & Barnes, J. (1985). Multidimensional self-concepts: Relations with sex and academic achievement. *Journal of Educational Psychology*, 77, pp. 581-596.

Matějček, Z. (2011). *Praxe dětského psychologického poradenství*. Praha: Portál.

Matějček, Z., & Vágnerová, M. (1992). *Dotazník sebepojetí školní úspěšnosti dětí*, Bratislava: Psychodiagnostika.

Matějček, Z., & Vágnerová, M. (Eds.) a kol. (2006). *Sociální aspekty dyslexie*, Praha: Karolinum.

Ogilvie, D.M. (1987). The undesired self: A neglected variable in personality research. *Journal of Personality and Social Psychology*, 52(2), pp. 379-385.

Poledňová, I., Stránská, Z., & Kmětíková, T. Sebepojetí dětí se specifickými poruchami učení, in I. Poledňová (Ed.) *Sebepojetí dětí a dospívajících v kontextu školy* (pp. 79-94), Brno: Masarykova univerzita,.

Rogers, C.R. (1951). *Client-Centered Therapy: Its Current Practice, Implications and Theory*. Boston: Houghton Mifflin.

Shavelson, R.J., Hubner, J.J., & Stanton, G.C. (1976). Self-Concept: Validation of construct interpretations, *Review of Educational Research*, 46(4), pp. 654-664.

Tafarodi, R.W., & Swann, W.B. (1995). Self-liking and self-competence as dimensions of global self-esteem: Initial validation of a measure. *Journal of Personality Assessment*, 65 (2), pp. 322-342.

Vágnerová, M., & Klégrová, J. (2008). *Poradenská psychologická diagnostika dětí a dospívajících*, Praha: Karolinum.

Skills Proficiency And Wages In Germany And UK

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ABSTRACT

This paper aims to analyze the influence of skills proficiency on wages in two European countries with mature economies and labour markets: Germany and UK. Our results highlight the need to study the importance of skills for assessing private returns of human capital development. The analysis is based on data provided by the Survey of Adult Skills (PIAAC, 2012). By looking at the link between labour market outcomes and human capital, this study offers valuable insights for public policies in the field of education and vocational training.

INTRODUCTION

Lives of individuals and companies are shaped and transformed by significant technological evolutions. As a result, the demand of skills is changing. One of the most important trends is the growing importance of the soft skills, with focus on information-processing and interpersonal skills. Higher level of skills is expected to determine higher level of productivity and competitiveness. However, there is still little knowledge on the stock and distribution of skills at country level.

As higher skills determine higher productivity, it is expected that individuals with higher skills proficiency to receive higher wages. Our study aims to analyze how skills are linked with wages in two different national contexts: UK and Germany. Both countries have mature economies and labour markets. So, our study intends to find out if the connection between skills and earnings is similar for both countries and how different skills produce economic returns for individuals in these two national contexts.

Most studies that analyze the impact of skills on earnings use as proxy indicators students' performances in assessment tests or grades of the students. However, such studies tend to underestimate the impact of the level of skills as they assess it mostly among youth (Hanushek, Schwerdt, Wiederhold and Woessman, 2014). Survey of Adult Skills (PIAAC, 2012) represents one of the most important sources of data measuring skills proficiency among adults which includes also data on earnings. Studies linking skills proficiency with earnings using PIAAC data are new in the field and brings new evidence which are very valuable for both the policy and academic areas. Hanushek, Schwerdt, Wiederhold and Woessman (2014), van Damme (2014) and Paccagnella (2015) undertook most relevant analysis in this sense and showed that higher level of skills is associated with higher average earnings in most of the countries that are covered by PIAAC Survey. However, their analysis were focused only on literacy and numeracy skills.

THE STUDY

The investigation undertaken in this study aimed to reduce the dimensionality of the data and to visualize it in a two dimensional space. Therefore we used multiple correspondence analysis (MCA) in order to emphasize the influence of skills proficiency on earnings.

We included in the analysis 9 categorical variables. First measures earnings and the other eight variables represent skill use information. These are scales scores (standardized and categorized weighted likelihood estimation) for skill use items in PIAAC background questionnaire (OECD, 2013).

Earnings (EARN) variable was built upon a continuous variable included in PIAAC data, capturing hourly earnings including bonuses for wage and salary earners, PPP corrected \$US. For the analysis developed on UK data, the five categories of EARN variable are defined using the quantiles of the numeric variable:

- In the category EARN 1 are included workers earning less than 11.20 PPP corrected \$US;
- In the category EARN 2 are included the respondents whose earnings lie between [11.20, 15.09);
- In the EARN 3 category are included those workers with earnings within the range [15.09, 19.55);
- In the EARN 4 category are included respondents whose earnings lie between [19.55, 26.53);
- In the EARN 5 category are included respondents earning more than 26.53 PPP corrected \$US.

For the Germany dataset, information regarding individual earnings is not available. Thus we build the earnings categories on the deciles of hourly earnings excluding bonuses for wage and salary earners which are provided by PIAAC.

The skill use indices were derived on respondent's answers to the questions regarding cognitive and non-cognitive skills used at work.

The categorical variable Learning at work (LEARN) is based on the Index of Learning at work variable from PIAAC. The variables used to derive this index measure the following aspects: learning from co-workers, learning by doing and keeping up to date. Each of the questions used to capture the Learning at work dimensions have five possible responses: (1) Never, (2) Less than once a month, (3) Less than once a week but at least once a month, (4) At least once a week but not every day, (5) Every day.

The variable denoted ICT is based on the Index of use of ICT skills at work. The variables used to derive this index measures how often respondents are using the internet or the computer for mail, work related information, to conduct transactions or real time discussions.

The variable denoted INFL comes from the Index of use of influencing skills at work. This measure is derived from the questions asking how often respondents are teaching people, advising people, influencing people, negotiating with people.

The variable denoted NUM is based on the Index of use of numeracy skills at work (basic and advanced). This measure is derived from the questions asking how often respondents are calculating costs or budgets, use or calculate fractions or percentages, use a calculator, prepare charts or tables, use simple algebra, use advanced math or statistics.

The variable denoted PLAN is based on the Index of use of planning skills at work. This measures how often workers are planning own activities, planning others activities, organizing own time.

The variable denoted READ is based on the Index of use of reading skills at work (prose and document texts). This variable captures how often workers read directions or instructions, letters, mails, newspaper, books, reference materials, diagrams, maps.

The variable denoted WRIT is based on the Index of use of writing skills at work. This index measures how often workers write letter, memos, mails, articles, reports or fill in forms.

The variable denoted TASK is based on the index of use of task discretion at work. This index measures work flexibility with respect to: work flexibility, sequence of tasks, speed of work, working hours. The scale for the answers to these questions is: not at all, very little, to some extent, to a high extent, to a very high extent.

The categories of these eight variables are as follows:

- Level 1 – lowest to 20%
- Level 2 - more than 20% to 40 %
- Level 3- more than 40% to 60%
- Level 4- more than 60% to 80%
- Level 5- more than 80%.

The findings presented in the next section are obtained by using adjusted Burt approach of MCA (Nenadic, Greenacre, 2007).

FINDINGS

We analyze firstly the data and the MCA map for Germany, and then the data for UK. Then we will make some comparative remarks but in terms of which labour market rewards more the skill proficiency, and which are the skills leading to higher incomes.

The Burt table for Germany produces the eigenvalues of 0.0837 and 0.0057. The eigenvalues reveal that two dimensions are enough to explain the data. On the first dimension (X axis) we captured mainly substantive variation due to incomes and skills proficiency, while the second dimension is reflecting the horseshoe effect, as one could expect when using ordinal data. The eigenvalues as well as the high importance of the first dimension in explaining variation, as well as the same direction from 1 to 5 for all skills included and represented in the MCA map, proves the high quality of data collected and included in the analyze.

The horizontal dimension in the map from MCA estimation for Germany dataset separates income quintiles on the basis of different skills proficiency. On the right side of the map we can find lower levels of incomes which are associated with lower levels of skills, while on the left side of the map we can find higher levels of incomes associated with higher levels of skills. Level 1 for all skills is associated with 1st income quintile, while level 5 of skills is associated with highest income quintile. The pattern of association for the ICT and planning skills is a little bit different with lower levels of skills being associated with higher levels of income. So, the labour market in Germany seems to put a premium on these two skills. Level 2 of different skills could be associated both with 2nd of 3rd quintile, while the 3rd level of skills is rather associated with the 4th income quintile. So, we could whiteness a labour market highly valuing and assuring higher rates of returns for the higher levels of skills, starting even with the 4th level.

dim	value	%	cum%	scree plot
1	0.083775	79.3	79.3	*****
2	0.005700	5.4	84.7	**
3	0.001223	1.2	85.9	
4	0.000847	0.8	86.7	
5	0.000574	0.5	87.2	
6	0.000343	0.3	87.5	
7	0.000291	0.3	87.8	
8	0.000185	0.2	88.0	
9	0.000146	0.1	88.1	
10	0.000126	0.1	88.2	
11	7.2e-050	0.1	88.3	
12	5.8e-050	0.1	88.4	
13	1.7e-050	0.0	88.4	
14	1.1e-050	0.0	88.4	
15	00000000	0.0	88.4	

Total: 0.105642				

Table 1: Principal inertias - Germany dataset

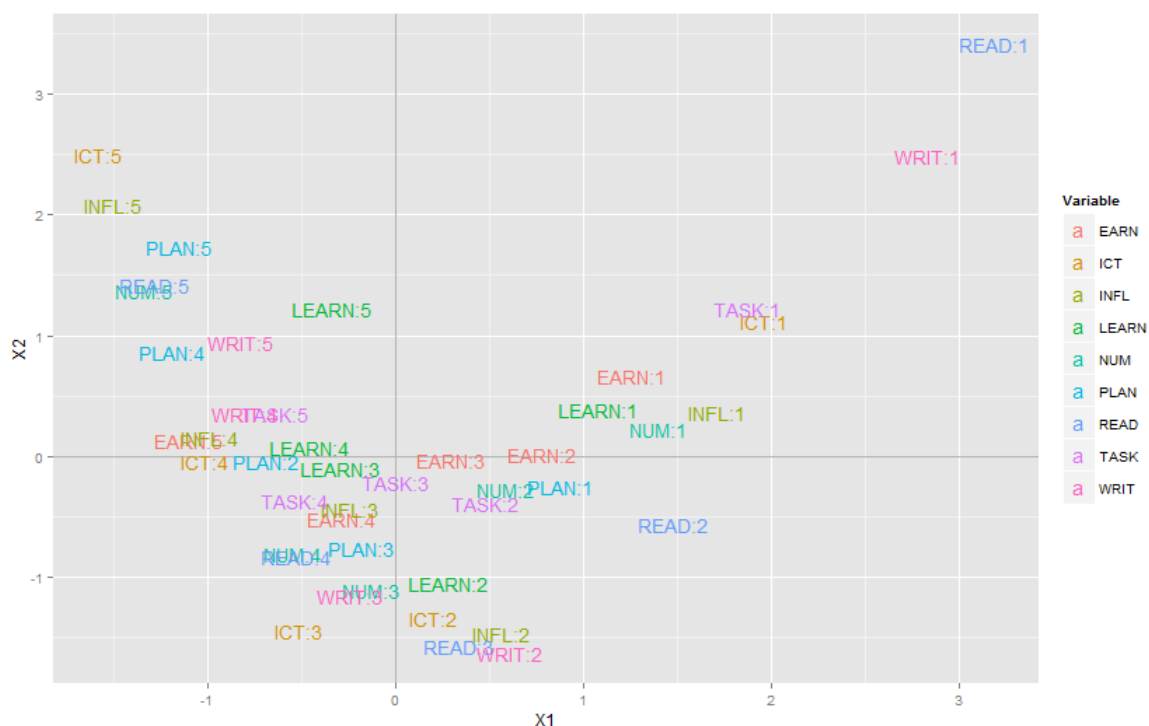


Figure 1: Map from MCA estimation - Germany dataset

The analyses run for the UK dataset leads to quite different results. The Burt table for UK produces eigenvalues of 0.1153 and 0.0099. The eigenvalues reveal again that two dimensions are enough to explain the variation within data. On the first dimension (X axis) we captured again the mainly substantive variation due to incomes and skills proficiency, while the second dimension is reflecting the horseshoe effect. The first dimension is substantive and captures 80% of the variation.

dim	value	%	cum%	scree plot
1	0.115390	80.0	80.0	*****
2	0.009934	6.9	86.9	**
3	0.003452	2.4	89.3	*
4	0.001098	0.8	90.0	
5	0.000276	0.2	90.2	
6	0.000197	0.1	90.4	
7	0.000176	0.1	90.5	
8	8.8e-050	0.1	90.6	
9	5.4e-050	0.0	90.6	
10	3.5e-050	0.0	90.6	
11	2.4e-050	0.0	90.6	
12	1.5e-050	0.0	90.6	
13	9e-06000	0.0	90.7	
14	00000000	0.0	90.7	

Total: 0.144233				

Table 2: Principal inertias - UK dataset

The MCA estimation represented in the map from figure 2 evidences a high degree of association in between different levels of skills and different levels of income: 1st level of skills is associated with the 1st income quintile, 2nd level of skills with 2nd income quintile and so on.

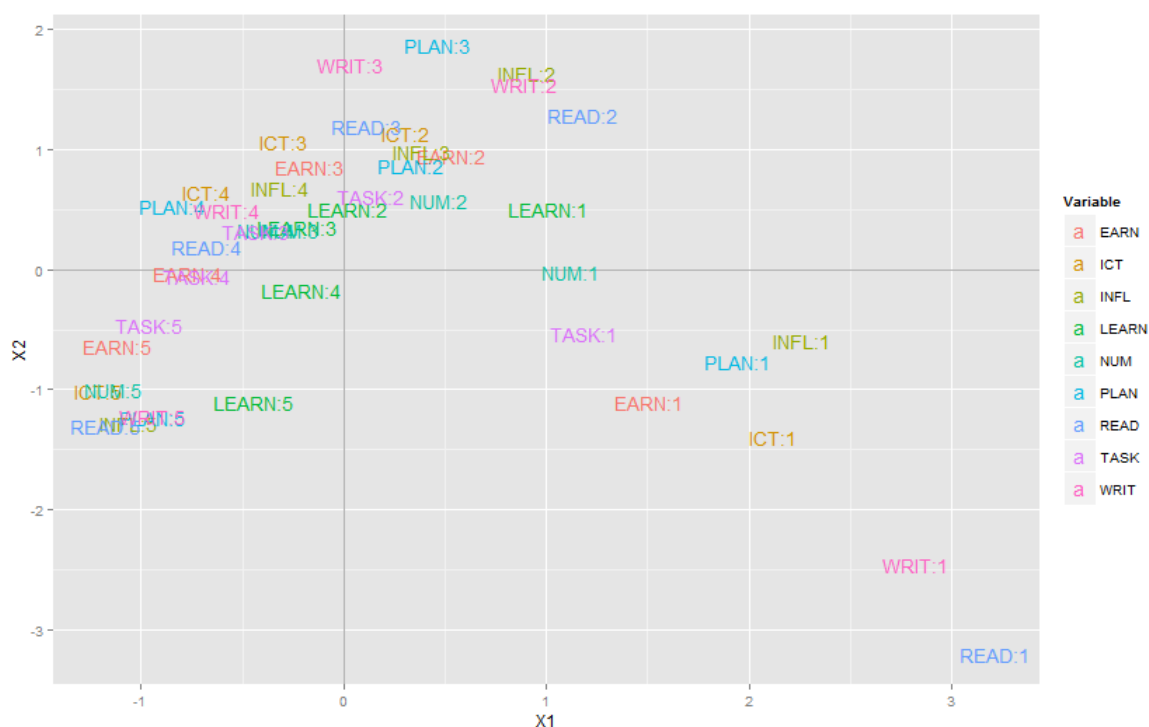


Figure 2: MAP from MCA estimation - UK dataset

If we want to compare the findings for the two mature economies, we can say on the one hand that each of the country values the higher levels of skills, but if in UK one must have the highest level of skills in order to reach the 5th income quintile, in Germany this is possible also with the 4th level of skills.

CONCLUSIONS

Our study represents one of the first analysis on the links between skills proficiency and earnings using PIAAC data. Moreover, by using MCA approach, we obtained visual outputs capturing the way higher levels of skills are associated with higher personal returns on the labour market. Such results advocates for the investments in human capital development, with a special focus on transversal skills such as: writing and reading skills, numeracy, ICT skills, planning skills, task discretion skills and influencing skills. Our main conclusion is that, in both German and UK labour markets, higher levels of skills are rewarded by the labour market.

Moreover, analyzing results for both countries, ICT skills seem to represents the class of competences that brings the highest level of return in both the national contexts. The use of ICT at the workplace becomes more and more important in rich technological economies. Therefore, such skills bring higher returns to individuals.

So far, the use of MCA approach allowed us to explore the way data on skills and earnings from PIAAC data set are linked. Future studies can assess the link between skills proficiency and earnings while taking into other supplementary variables such as education, gender, age, sector or occupation.

References

- Gangl, M. (2003). Returns to education in context: individual education and transition outcomes in European labour markets, in Müller, W. and Gangl, M. (Eds.), *Transitions from Education to Work in Europe: The Integration of Youth into EU Labour Markets*, Oxford: Oxford University press, pp. 156-185.
- Hanushek E. A., Schwerdt G., Wiederhold S., Woessmann L. (2014). Returns to Skills around the World: Evidence from PIAAC, CESIFO Working Paper No. 45597
file:///C:/Users/user/Downloads/cesifo1_wp4597.pdf
- Nenadic, O., & Greenacre, M. (2007). Correspondence analysis in R, with two-and three-dimensional graphics: the ca package.
- OECD (2013) Technical Report of the Survey of Adult Skills (PIAAC).
- OECD (2013). OECD Skills Outlook 2013: First Results from the Survey of Adult Skills. OECD Publishing. <http://dx.doi.org/10.1787/9789264204256-en>
- OECD (2014). Education at a Glance 2014. Paris: OECD.
- Paccagnella, M. (2015). Skills and Wage Inequality: Evidence from PIAAC, OECD Education Working Papers, No. 114, OECD Publishing. <http://dx.doi.org/10.1787/5js4xfgl4ks0-en>
- Van Damme, D. (2014). How closely is the distribution of skills related to countries' overall level of social inequality and economic prosperity?, OECD Education Working Papers No. 105, OECD Publishing. <http://dx.doi.org/10.1787/5jxvd5rk3tnx-en>.

Soft Skills Recognition, Validation And Certification In A Lifelong Learning Perspective. Presentation Of The Project Unimc For Soft Skills

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ABSTRACT

The issue of recognition, validation and certification of skills, especially those developed in non-formal and informal fields, is becoming a current topic for all educative institutions, including University. The main aim is to promote lifelong learning, a strategic factor for individual fulfilment in work and for social aspects. Soft skills is a psycho-sociological term relating to a cluster of personality traits, social abilities, communication, language, personal attitudes that characterize relationships with other people. Soft skills complement hard skills which are the occupational requirements of a job and many other activities. In Italy the legal framework on skills is leaded by the Legislative Decree n. 13/13. According to the Decree, University should assure the effective implementation of lifelong learning through guidance and counselling services. The University of Macerata (UNIMC) has been involved from a long time in the field of soft skills with activities to develop informal and non-formal learning and recently, a system to recognize and validate them has been experienced. A Pilot Project structured in three phases - recognition, validation and certification of the soft skills - was introduced within Alternating School and Work Project, which involved 12 students of a local High School in an internship at Unimc.

Keywords: soft skills; lifelong learning; informal learning; non-formal learning; guidance; counselling; skills certification system; internship.

INTRODUCTION

The issue of *recognition, validation and certification of skills*, especially those developed in non-formal and informal fields, is becoming a current topic for all educative institutions, including University. The main aim is to promote *lifelong learning*, which is defined as «all learning activity, whether formal, non-formal or informal, undertaken throughout life, with the aim of improving knowledge, skills and competences in a perspective of personal, civic, social and employment growth» (Bertagna, Casano, & Tiraboschi, 2012).

Lifelong learning is considered by the European Union as a strategic factor for individual fulfilment in work and social aspects (Field, 2005). In addition, it is considered an essential contribution to the implementation of the *Europe 2020 Strategy* for a smart, sustainable and inclusive growth (European Commission, 2009). At the same time, the European Council Recommendation of the 20th December 2012, on the validation of *non-formal* and *informal learning*, proposes the development of knowledge, skills and competencies aiming at an economic growth and employment (European Commission, 2012).

In particular we are interested in *soft skills*, considered as a psycho-sociological cluster of personality traits, social proprieties, communication, language, personal habits, and friendliness, that characterizes relationships with other people (Le Boterf, 1994). Soft skills are personal attributes that enhance individual's interactions, job performance and career prospects. Under this perspective soft skills complement hard skills, which are the main

technical and theoretical requirements for a job. Unlike hard skills, which are specifically related to a specific task or activity, soft skills are related to the personal abilities to interact effectively with coworkers and customers and are broadly applicable to different kind of performances, both in and outside the workplace (Rey, 2003). Over the long term, to manage soft skills may be even more important than to possess hard skills. The legal profession is an example, where the ability to deal with people effectively and politely can determine the professional success of a lawyer. Due to their added value, it is important to identify them and certify that they are available to be used.

According to the Italian legislation, the University of Macerata has been involved from a long time in the field of soft skills training. In the last period a Pilot Project aimed to the *recognition, validation and certification* of soft skills was made up. We will discuss the contents, the phases, the results and the issues of this experience.

THE LEGAL FRAMEWORK AND THE ROLE OF THE UNIVERSITY

The Italian legal framework on *recognition, validation and certification of skills* is led by the Legislative Decree n. 13/13 (pursuant to paragraphs 58 and 68, Article 4, of Law No. 92/2012) which defines *the general rules and the basic performance for the identification and validation of non-formal and informal learning as well as the minimum service standards of the National System of Certification of Skills*. This measure introduces a recognition of acquired skills throughout lifetime, even to develop a European skills Framework usable by the citizens. The Law is based on main statements such as the definitions of *competence, skill, non-formal learning, informal learning, formal learning and lifelong learning*. The identification of the *Public Authorities*, including University, and *Private Authorities* which are accredited to certificate skills acquired by students and workers is quoted in the same Law as well.

According to the Legislative Decree n. 13/13 *non-formal learning* is defined as a learning characterized by a deliberate choice of the person, which is conducted out of education and training system with but ending with the release of an educational qualification. On the other end, the *non-formal learning* takes place in every organism pursuing educational and training purposes, such as volunteering, National Civil Service and internship (Isfol, 2012).

THE PILOT PROJECT “UNIMC FOR SOFT SKILLS” FOR THE *RECOGNITION, VALIDATION AND CERTIFICATION OF THE SOFT SKILLS*

The University of Macerata (UNIMC), committed from a long time in the field of soft skills development (Nicolini & Pojaghi, 2006), provides to the students many activities aimed to acquire relational and methodological skills, such as: effective communication, teamwork, conflict management, negotiation, problem solving, etc. Among various experiences offered from the 1975, we can mention the Workshop for Observing Children at School (Nicolini & Lapucci, 2009) as well as the Training to Communication Laboratory (Nicolini & Lapucci, 2011) as for formal learning experience. In addition participation in editorial staff of important cultural events in the territory, collaborations with the University Radio and the workshop to design the University Advertising Campaign, as for informal learning activities.

Specifically, along several years UNIMC has been participating to the Project *Alternating School and Work* which is sponsored by the local Chamber of Commerce and the Regional Education Office. The Project involves High School students in an internship at Public Administrations, Local Authorities and Professional Studies to promote the integration between school and work (article 4 of Law No. 53/2003).

In view of the future commitment of the University in the field of skills certification in *non-formal learning*, a research team from UNIMC Orientation Office introduced within *Alternating School and Work* a Pilot Project called *Unimc for Soft Skills*, which involved 12 students of a local High School in the period between January and February 2014. Following the indications of Italian and European legislation, the Project was structured in five phases to *recognise, validate and certify* the *soft skills* likely acquired or consolidated during the internship.

First phase of Pilot Project

The first phase of the Pilot Project was dedicated to the identification of the targeted soft skills mainly required during the internship at UNIMC by the students (Winterton, Delamare-Le Deist, & Stringfellow, 2005). For the aim of the *Alternating School and Work* project we outlined four soft skills:

- *Observation*
- *Listening*
- *Communication in group*
- *Problem solving*

As theoretical reference, the definition of the four soft skills employed in an experienced and knowledgeable

way was used. A definition of an expert approach for each soft skill is provided below:

Observation

An expert approach in *observation* consists in to able to distinguish between data that can be directly observed in the description of a phenomenon - such as actions, words and non-verbal behaviors - and items that can only be deduced because belonging to the inner world of the subject observed - such as thoughts, feelings and intentions. Furthermore, the competent observer fits the times and places where the observation takes place, taking care to discuss own comments and being aware of own point of view.

Listening

A good expertise in *listening* is characterized by the ability to select among an amount of information the most significant ones in relation to the objective of communication.

Communication in small group

An expert approach to *communication in small group* is distinguished by the ability to clearly express opinions and emotions, avoiding to minimize, to trivialize or to make fan of other's ideas and frame of mind, also offering recognition to other's ideas. Also, it allows to change own attitudes based on the discussion in group.

Problem solving

To have a good expertise in *problem solving* means to be able to process the different information available to identify answers to the problems encountered, sometimes also in an original way. Also, it permits to transfer learned strategies, adapting them to new contexts. Finally, an expert approach is characterized by the ability to use an overview able to take on the problem from an outside perspective.

Second phase of Pilot Project

Using the definitions described above, the second phase of the project consisted in the operationalizing of the four soft skills, declined them in three levels of expertise, through the identification of specific indicators for each skill (Nicolini, Moroni, & Lapucci, 2009): *basic*, *intermediate* and *advanced*.

As an example, we will illustrate the operationalization of the *Communication in small group* competence. In the Table 1 the indicators which identify the *communication in small group* of *basic* and *advanced levels* are illustrated (Pojaghi & Nicolini, 2011).

Table 1. Communication in small group indicators

In small group basic communication	In small group advanced communication
To remain mainly silent during the discussion	To take an active part in the discussion
To carry on own opinion only at once considering the opinions of the other participants	To propose and stimulating speeches, listening and taking into consideration the opinions of the other participants
To intervene with speeches not actually relevant to the group objective	To return the discussion towards the group objective to be achieved
To use a personal language or technical terms, without checking whether they are comprehensible to the other participants	To use a shared linguistic repertoire
To minimize ideas or frame of mind expressed by the other participants	To offer recognition to the thoughts and frame of mind of the other participants
To maintain the same style of communication during the group interaction, without measuring it in relation to others	To change the way of relating based on the feedback received by the other participants
To keep the speech for a long time	To intervene synthetically and clearly
To interrupt others in their speeches	To encourage others to participate and to support them expressing their point of view

Following the operationalization just showed in the Table 1, the three competence levels of the *Communication in small group* skills are described as in the following list:

- *Basic*: the student mainly uses the elements of a basic approach within the communication in small group.
- *Intermediate*: the student uses the characteristics of both approaches, in a mixed way, within the communication in small group.

- *Advanced*: the student uses all or most of the indicators of an expert approach within the communication in small group.

Third phase of Pilot Project

In this phase, several tasks related to every skill were identified and then tested by the research team. This step involved the group of experts in a deep analysis of the different tasks, to arrive at a shared and convinced choice of the activities to be proposed. After different pilot experiences, two tasks for each of the four soft skills were selected to be used in two different moments, as an entrance and in exit assignments (Trinchero, 2013). The selection of the tasks able to ascertain the level of soft skills possessed by the students at the beginning and at the end of the experience was the crucial passage of the project. In fact, the two tasks selected for each of the soft skills need to be homologous but not completely identical, to ward off a sort of "training activity" effect, instead of an actual recognition of the soft skills acquisition (Le Boterf, 1994).

As an example, we briefly illustrate the entrance task for the *Communication in small group* skill. It consists in a discussion in small group to reach a common solution to an assignment, during twenty minutes. After informing the group about the activity to carry on, the development of the discussion within the group was recorded through a video camera. Simultaneously, two members of the research team took notes through a check list of the conversation and the exchanges within the participants (Bresciani, 2012).

Fourth phase of Pilot Project

In the fourth phase the results of the proposed activities were analysed by each expert involved in the soft skills survey, using the indicators identified for each soft skill. Subsequently, the whole group of experts shared the results and discussed all doubtful cases, to arrive to a consensual assessment. In the Table 2 the students' entrance and in exit levels of expertise for each soft skill are illustrated.

Table 2. In entrance and in exit students' soft skills levels

Stud .	Observation		Listening		Communication small group		in Problem solving	
	entrance level	exit level	entrance level	exit level	entrance level	exit level	entrance level	exit level
1	basic	intermediate	basic	intermediate	basic	advanced	basic	intermediate
2	basic	intermediate	intermediate	Basic	intermediate	basic	intermediate	intermediate
3	intermediate	advanced	intermediate	advanced	advanced	advanced	intermediate	intermediate
4	basic	intermediate	intermediate	Basic	basic	basic	advanced	advanced
5	basic	intermediate	basic	Basic	basic	basic	intermediate	intermediate
6	intermediate	intermediate	basic	Basic	basic	intermediate	intermediate	intermediate
7	intermediate	advanced	intermediate	intermediate	intermediate	intermediate	intermediate	intermediate
8	basic	intermediate	basic	intermediate	intermediate	intermediate	advanced	advanced
9	basic	advanced	intermediate	advanced	advanced	advanced	intermediate	intermediate
10	intermediate	basic	basic	advanced	intermediate	intermediate	advanced	advanced
11	basic	intermediate	advanced	advanced	advanced	advanced	basic	intermediate
12	basic	basic	basic	advanced	intermediate	advanced	intermediate	basic

As the Table 2 shows, almost all the students improved their skills. In particular, eight students out of twelve showed a significant evolution in the owned skills, moving from basic or intermediate to intermediate or advanced level.

Analysing the four cases where the students seem to be regressed, it is possible that the motivation factor induced the same subject to produce different performance, as in other cases or fields. However, if a subject is able to carry out a performance at an intermediate level, it is quite sure that he/she owns and he/she has consolidated a basic level of the same skill.

Taking into consideration that all the participants were students, it is not surprising that they showed above all *problem solving skills* already in the entrance task, and also that an actual development is not considerable under this perspective. In fact, *problem solving* is one of the most requested skill in learning process at school. On the other hand, observation and communication in group seem to be not so much developed at the beginning of the experience, while the participants obtained good performances at the end. In fact, these kind of skills were the most requested to take actively part to the activities at UNIMC offices.

Fifth phase of Pilot Project

Once the internship was over, a document was sent by email to each student with the acquired soft skills degree declaration, using the three identified level (basic, intermediate and advanced). The document illustrates student's development, highlighting the owned skills in the entrance and exit tasks, with particular attention to the improvements. In addition, a file contained general explanations on the topic of soft skills and a focus on *Unimc for Soft Skills Project* was included.

CONCLUSION

Applying the project, we reached some important results to be outlined. First of all we reached the goal to identify and operationalize a series of soft skills, declining indicators to recognize different levels of expertise. We also selected a collection of tested tasks useful to assess the different soft skill levels.

As a secondary outcome, during the internship at UNIMC a development of soft skills possessed by students was observed. This shows the validity of the Alternating School and Work experience, especially in the development of non-formal learning.

Although the Unimc for Soft Skills was a Pilot Project, it achieved good results also in terms of students participation, taking into consideration that twelve out of thirteen students completed the path, even if the evaluation of their soft skills levels was not compulsory.

Providing for the first time the issuance of a certificate with the soft skills acquisition declaration, the project reinforced the UNIMC commitment to promote the development of non-formal and informal learning. Next year the University of Macerata intends to intensify its role in lifelong learning. Specifically, *The Good Work* module will be activated, in which conveying all the initiatives proposed or hosted by the University to develop soft skills. Students who will participate in one or more of the activities set out by *The Good Work* module, can be seen certified the soft skills acquired. The certificate obtained can be used in the presentation of CV. The aim is to structure a stable system of *recognition, validation and certification of soft skills* acquired in each informal and non-formal experiences offered by University, launching an accredited University agency.

References

- Bertagna, G., Casano, L., & Tiraboschi, M. (2012). Apprendimento permanente e certificazione delle competenze nella nuova riforma del lavoro. DRI, 3.
- Bresciani, P.G. (2012). Capire la competenza. Teorie, metodi, esperienze dall'analisi alla certificazione. Milano: FrancoAngeli.
- European Commission (2009). Council conclusions of 12 May 2009 on strategic framework for European cooperation in education and training, (ET 2020).
- European Commission (2012). Raccomandazione del Consiglio Europeo del 20 dicembre 2012, Convalida dell'apprendimento non formale e informale (2012/C 398/01).
- Field, J. (2005). Social Capital and Lifelong Learning. Bristol: Policy Press.
- Isfol (2012). Le competenze per l'occupazione e la crescita. Roma: Rubettino Editore.
- Le Boterf, G. (1994). De la competence: essai sur un attracteur étrange. Paris: Les Editions d'Organisation.
- Nicolini, P., & Pojaghi, B. (2006). Il rispetto dell'Altro nella formazione e nell'insegnamento. Scritti in onore di Anna Arfelli Galli. Macerata: EUM.
- Nicolini, P., & Lapucci, T. (2009). Training as exchange and negotiation of knowledge: online and in presence experiences. Proceedings of ICODL 2009, 5th International Conference on Open and Distance Learning, Open and Distance Education for Global Collaboration & Educational Development, 27 -29 November 2009. Athens, section B, volume D, pp. 166-175.
- Nicolini, P., & Lapucci, T. (2011). Interazione fra pari tra formazione tradizionale e a distanza: l'esperienza del Laboratorio di Addestramento della Comunicazione. In P. Nicolini (Ed.), Le dimensioni sociali nell'apprendimento e nella formazione. Il ruolo dell'interazione tra pari (pp. 410-432). Parma: Junior-Spaggiari.
- Nicolini, P., Moroni, C., & Lapucci, T. (2009). La negoziazione nei processi di insegnamento-apprendimento online: il senso e le caratteristiche. In D. Coppola & P. Nicolini (Eds.), Comunicazione e processi di formazione. Un approccio interdisciplinare (330-369). Milano: FrancoAngeli.
- Pojaghi, B., & Nicolini, P. (2011). Contributi di psicologia sociale in contesti socio-educativi. Milano: FrancoAngeli.
- Rey, B. (2003). Ripensare le competenze trasversali. Milano: FrancoAngeli.

- Trinchero, R. (2013). Progettare prove di valutazione. Buone prassi per la certificazione delle competenze. In V. Careglio, Buone prassi per la certificazione delle competenze al termine dell'obbligo di istruzione (pp. 38-70). Torino: Loescher Editore.
- Winterton, J., Delamare-Le Deist, F., & Stringfellow, E. (2005). Typology of Knowledge, skills and competences. Thessaloniki: Cedefop.

Student Diversity, Peer Instruction And Classroom Response Systems – Some Lessons

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ABSTRACT

The diversity of undergraduate students within a given lecture is on the increase – both in terms of their personal traits and their performance. The latter development presents a challenge to lecturers, who may have difficulty adapting their teaching methodology because the students' actual performance often materialises only at the end of the term.

Based on practical experience, this paper shows how classroom response systems, using so-called 'clickers', can be employed to address this challenge in several ways. A brief test of the material already taught in the first few lectures can provide the lecturer with a rough impression of the performance level in the class right at the start of the term. Yet, more interesting information is to be obtained from a simultaneous survey of potentially performance-related characteristics of the students. Simple statistical analysis will then reveal whether and, if so, which characteristics actually drive student performance. In the best case, the insights thus gained can be used to adapt teaching styles. The paper further argues that the continuous use of clickers in conjunction with the method of peer instruction can appreciably improve learning results without consuming too much lecture time.

INTRODUCTION

Classroom response devices, so-called clickers (see, e.g., Kundisch et al. 2013), are experiencing ever wider use and have been associated with a number of benefits in teaching (Kay/LeSage 2009, Caldwell 2007, Simpson/Oliver 2007). For example, clickers enable a lecturer to conduct single or multiple choice tests, whose questions and corresponding answer choices are shown to all students. The students use the clickers to select and to transmit their choices. All responses are recorded and – later on – analysed. Based on the example of a practical application, this paper shows how such analysis can shed light on student diversity, performance, and the relationship between these two phenomena. In doing so, the paper will thus demonstrate a further benefit of the use of clickers, which has so far received little attention.

This agenda is to be seen against the background that the diversity of student bodies is increasing – certainly in Germany (Willich et al. 2011, DSW 2014), but presumably also in many other countries. From this development springs the concern that in large classes it may become increasingly difficult to pursue a teaching style that does justice to most if not all students (Krüger-Basener et al. 2013, Wielepp 2013). This is because we may assume that certain characteristics of the students correlate with their performance and thus, increasing diversity in terms of those characteristics may be expected to entail an increasing divergence of performance.

Lecturers who encounter a new class would well like to have some reliable data on the composition of the student body so as to be able to adapt their teaching styles. Relevant information might for example include the level of performance, prior education (e.g. A-levels or equivalent), or language proficiency. Such information will typically not be available, or at best in unsatisfactory quality, such as might be gained from simply eyeballing the group of students. Information on student performance is altogether lacking, and any attempt to predict performance based on visible student characteristics is prone to error and prejudice. The desired information will usually only materialise during the term (from oral participation) or even at the end of it (from exams) – by which time it is too late to make any use of it.

For these reasons, the authors wish to propose the following procedure: Right at the start of a term in which the lecturer takes on a new class and as soon as sufficient material has been taught for a short test, such a test is conducted using clickers. The test of the actual teaching contents is preceded by a set of questions designed to retrieve information on student characteristics which the lecturer suspects may correlate with performance. Within hours of the test, the lecturer will thus be able to generate the following insights about the class:

- 1) **DESCRIPTION OF THE STUDENT BODY.** How diverse is the class with respect to the chosen sociodemographic traits? Simple descriptive statistics can already be quite informative, e.g. if the lecturer learns that only 10% of students in a quantitative methods course specialised in mathematics in their prior education.
- 2) **APPASING THE LEVEL OF PERFORMANCE.** Primary interest is on the number of lecture-related questions correctly answered – both in terms of the average and the level of dispersion. A high average and low dispersion (the best case) will suggest a different teaching style than a low average and high dispersion (worst case). A certain level of teaching experience in the lecture course in question is required, though, to correctly assess the results.
- 3) **RELATIONSHIP BETWEEN SOCIODEMOGRAPHIC FACTORS AND PERFORMANCE.** It might be of interest, for example, to learn (from ‘1’ above) that for two-thirds of the class, the language of instruction is not their native language. This could be interpreted as a problem. Statistical analysis may show, however, that performance is actually independent of language skills.

A lecturer who possesses valuable information in these three fields already at the start of the term will be able to adapt her teaching accordingly and, thus, to achieve better learning outcomes. Using the example of trials conducted in the class *Einführung Personal* (Introduction to Human Resource Management) at the University of Hamburg during the winter term 2013/2014, we shall demonstrate how clickers can be employed to collect such information.

Besides providing some exemplary answers in the three areas of interest, this article will argue that the collection of the underlying information is practical and suitable for widespread application in the sense that it requires only a small amount of lecture time: A few minutes of a single lecture suffice to retrieve meaningful data. Finally, the trials also prove useful as a test of the method of peer instruction (Mazur 2013). We argue that clickers can easily and profitably be used to conduct a brief review test of the previously taught material at the beginning of each lecture.

DIVERSITY

Four sociodemographic characteristics were selected for the present study at the University of Hamburg. In practical terms, prior to answering the set of questions that relate to the lecture content, the students were presented with four questions concerning their personal traits, and they were asked to transmit the answers (in terms of categories, e.g. age bracket) via the clickers. In other contexts, depending on the lecturer’s aims, other characteristics than the ones described here – and different numbers of them – will be appropriate. In the following, we will elaborate on the backgrounds of these characteristics and present some simple descriptive statistics of their manifestation within the group of students examined.

The first characteristic concerns the students’ gender, which, however, is only of subordinate interest to the present investigation as in this specific context there is in fact little reason to suspect gender to correlate with the students’ performance. The case may, by contrast, be quite different in other contexts. Consider, for example, a study course that is strongly dominated by students of one sex (e.g. naval engineering versus midwifery). One might expect that the members of the minority have a particular motivation to pursue the course and that their performance therefore exceeds that of the majority. It might be worthwhile for the lecturer to anticipate such a potential effect.

While the students’ sex is probably the characteristic that is most easily determined visually, its later association with performance is only possible if the data is recorded electronically, i.e. via clickers. In the class examined, 102 out of 121 students responded to all four sociodemographic questions. The group comprised 46 females and 56 males.

Next, the student’s age was recorded, resulting in the frequency distribution displayed in Figure 1. Information on this characteristic, too, would be obtainable from a mere visual inspection of the classroom. Analogously, the added value of data collection via clickers also lies in the subsequent statistical association between age and performance. Once again, the course examined provides no reason to suspect any age effect. Yet imagine, for example, teaching the English language at an Eastern European university, where the language was rarely taught in high schools before the early 1990s. In such a situation, mature students may have significantly lower prior language skills and may thus be disadvantaged in their studies.

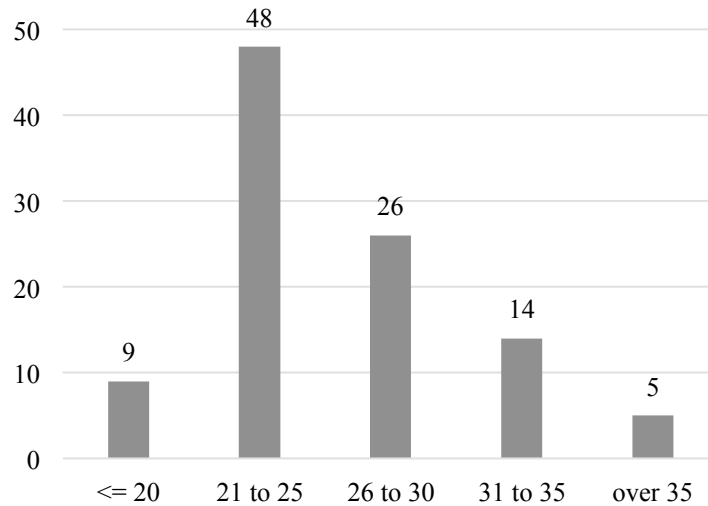


Figure 1. Age

The third characteristic concerns the manner in which the students qualified for entrance to the university. At least in Germany, universities and courses of studies are increasingly opening up to applicants who have not passed the *Abitur* (high school leaving exam equivalent to A-levels) (KMK 2014). It is not far-fetched to suspect an association between the students' prior education and their performance in class (Erdel 2010, Jirjahn 2007). A lecturer may wish to know whether the class she faces for the first time comprises 90% or only 50% students with A-levels. The descriptive statistics for the class examined are shown in Figure 2. In this case, three entrance options besides *Abitur* were distinguished: "*Fachabitur*" (a specialised form of *Abitur* that can be obtained with one year less of education) in conjunction with an oral entrance exam; written and oral "entrance exam"; and "other" (e.g. master craftsmen).

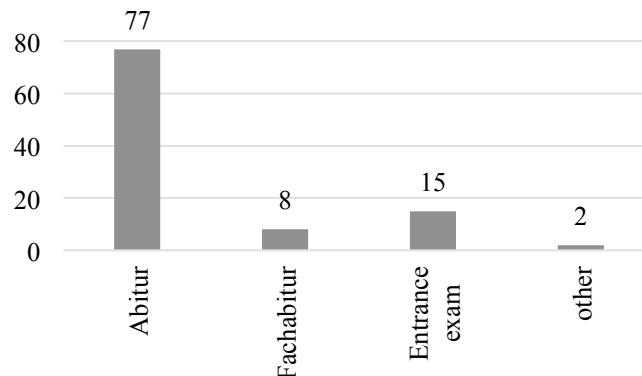


Figure 2. University entrance qualification

Finally, the students were asked about their migratory background. Plausibly, students who were not, or whose parents were not or only partially socialised in the country where the instruction takes place may have greater difficulty getting their bearings in the specific organisational, social and educational environment they find themselves in. A lecturer who ascertains a relatively large share of non-native students in the class and who, in the course of the analysis described in the next section, also learns that such a background can impede the students' academic success, might pay special attention to such students' needs, for example by providing them with additional information to help them navigate their studies. Figure 3 shows the frequency distribution as pertaining to the student body examined, distinguishing between students without any migratory background ("no MB"), students with German citizenship and "1st / 2nd generation migratory background", respectively, and students with a "foreign citizenship".

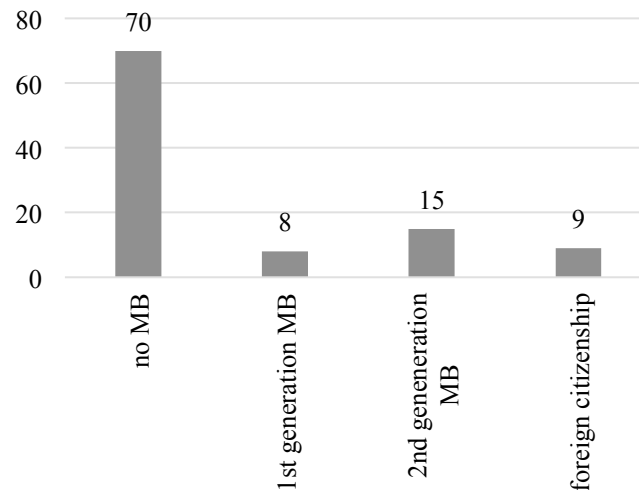


Figure 3. Migratory background (MB)

In other contexts, the lecturer's information needs will suggest the retrieval of different characteristics, including for example:

- prior education, e.g. certain areas of specialisation in high school
- prior professional experience, e.g. having worked as a nurse before studying medicine
- A query of the students' language skills (be it by way of self-assessment or through a short language test using clickers) can help the lecturer decide whether to incorporate foreign-language literature in the course.

PERFORMANCE

In our application at the University of Hamburg, the four sociodemographic questions were followed by a set of eight questions on contents already taught in the introductory HRM course. Each question was accompanied by four to five answer choices, of which the students were to select one using their clickers. The questions and answers are available on request. The ensuing frequency distribution of the number of correct responses is depicted in Figure 4. We do not differentiate between wrong answers and cases in which the students failed to provide any response. The average value is 4.14; the curve is reminiscent of a normal distribution. Measures of dispersion are not informative in this case since we lack a point of comparison.

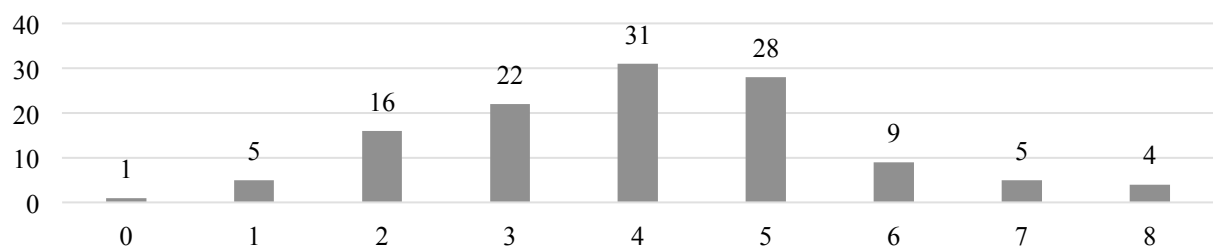


Figure 4. Number of correct responses

In a next step, we relate the students' sociodemographic characteristics to their performance. For this purpose, the number of correct responses becomes the dependent variable in a regression of performance on the four sociodemographic factors. The regression covers the 102 students who responded to all four sociodemographic questions. The answers to each of these four questions forms a categorical variable (age classes, male/female, etc.), which cannot directly be included in a regression. Instead – with the exception of a base (or omitted) category for each variable –, each category is assigned a newly-created dummy variable which can only assume the values of 1 (category applies) and 0 (does not apply). Thus, splitting the four categorical variables into the necessary number of dummy variables, we obtain a total of 11. Table 1 shows the assignment of the different categories of each of the four characteristics to new dummy variables, where “---” denotes the omitted categories.

Personal traits	Categories	Dummies Model I	Dummies Model II
Gender	male	---	---
	female	female	female
Age	up to 20 years	---	young
	21 to 25 years	25	
	26 to 30 years	30	---
	31 to 35 years	35	
	over 35 years	35+	
University entrance qualification	Abitur	---	Abitur
	Fachabitur	FA	---
	Entrance exam	EE	
	other	other	
Migratory background (MB)	no MB	---	no MB
	MB 1 st generation	MB1	---
	MB 2 nd generation	MB2	
	foreign citizenship	other	

Table 1. Transforming the sociodemographic characteristics into dummy variables

In ‘Model I’ the categories were transformed to dummies one-for-one. To estimate the model, we purposely relied on the simplest OLS procedure, which can be executed in Microsoft Excel, so as not to create any artificial obstacles to imitation by lecturers with only a limited knowledge of statistics. The results are not reproduced here – for the sole reason that no statistically significant effect on performance was found for any of the characteristics or its categories.

In ‘Model II’, the dummy variables were assigned in such a way that each characteristic now only consists of two categories, e.g. age up to 25 years (“young” = 1) or above (“young” = 0). This assignment was done in light of the regression coefficients obtained in model 1 in such a fashion that the probability of finding significant results was maximised. The estimation results of model II, too, are quickly summarised: The only statistically significant outcome suggest that students without any migratory background marginally outperform those with foreign roots ($z = 2.259$).

At this point, readers may raise the objection that our failure to find performance effects (with one exception) is not due to the actual lack of such effects but rather to the unsophisticated methodology employed, be it with respect to the quality of the sample, the measurement of performance or the estimation strategy. While such an objection could not be altogether rejected, it would, however, miss the point of the present exercise. The point is to provide lecturers with a means to quickly and easily discover any potential strong relationships between the students’ characteristics and their performance so that, in the best case, lecturers may be able to respond to such relationships by adopting their teaching styles. Performance effects that are so weak that they can only be detected with sophisticated methods – as may be the case in the setting described here – are therefore hardly of interest.

Furthermore, it must be noted that this (in a statistical sense) negative result of insignificant performance effects is indeed rather good news for the lecturer, as well as for the university: The observable, pronounced (and arguably increasing) diversity of students does not appear to systematically entail a divergence of performance levels. According to our data at least, the concern that increasing diversity may pose a challenge to teaching is therefore unwarranted.

PEER INSTRUCTION

After the students had answered all four sociodemographic questions, and each time after they had individually answered one of the eight lecture-related questions, they were asked to discuss the same question once again with their neighbour in the lecture theatre. The teams of two were given 90 seconds to exchange arguments regarding the correct response before transmitting their answers via the clickers again.

This additional aspect of our investigation is based on, and at the same time provides an opportunity to appraise, the method of peer instruction. This method promises to activate large numbers of students and to enable interactive learning by encouraging the students to learn autonomously and to correct each other's mistakes (Mazur 2013). A number of variations of peer instruction have been developed, e.g. with respect to the manner in which the teaching contents are conveyed (for self-study versus lectures, see Schmucker 2015). In the present case, the material was imparted by means of traditional lectures.

This set-up reveals that for all eight questions, the relative frequency of the correct response after the team discussion exceeded that of the prior individual responses (see Figure 5).

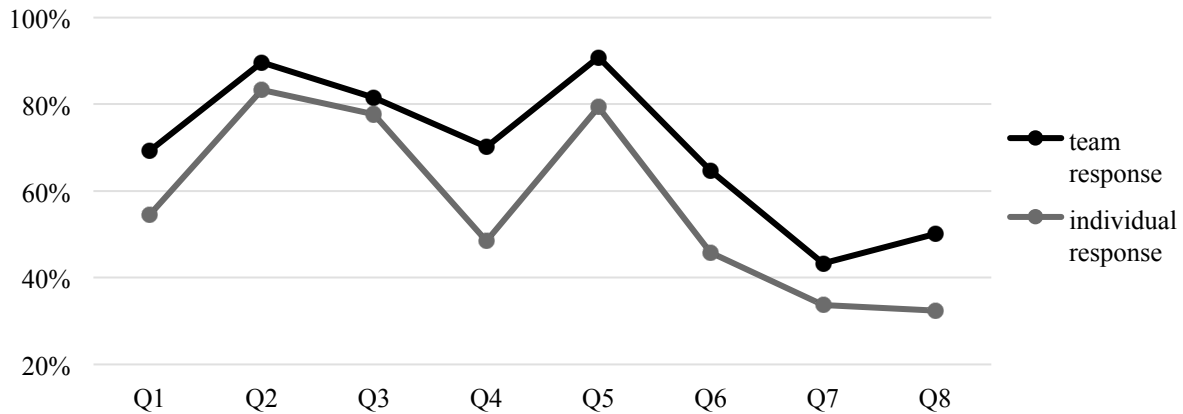


Figure 5. Relative frequencies of the correct response

In aggregate across all eight questions, the individual responses have a 'success rate' of selecting the correct answer of 57%, while the rate is 68% for the team responses. The difference is statistically significant ($t = 3.33$).

It thus appears that in the course of the discussion, better opinions tend to prevail, implying that successful learning must have taken place relative to the individual response round. After all, many students 'recognise' their individual mistakes and henceforth 'know' the correct response. Yet we cannot quite exclude the possibility that the higher success rate is merely due to the additional available time: a total of 150 seconds compared to only 60 seconds for the individual responses. The results presented in the next section, however, do not suggest that prolonging the available time will yield significantly better responses. A full answer to this potential objection would require additional research of the kind outlined in the conclusion.

However, the set-up does not permit any statement as to whether the improved team performance indeed owes to the exchange of arguments in the discussion phase or whether perhaps the two team members have other means of quickly reaching a team opinion without even addressing the questions and answer choices supplied. Regarding the latter possibility, imagine for example that the team members knew each other's performance (i.e. the probability of knowing the correct response) before they even met so that, upon meeting, they simply embrace the opinion of the supposedly superior team member. Or: Rather than exchanging arguments, the team members merely communicate the degree to which they are certain about the correct response, and they simply adopt the opinion of whoever feels more certain as the team response.

Considering the improved learning outcomes – whatever may cause them – and the small amount of time consumed by the procedure (discussed in more detail in the next section), we would like to suggest that a short, clicker-based test of the material taught previously should be conducted at the start of each lecture. The set-up may be limited to the team phase described above. In conjunction with such a use of clickers and as a supplement to lectures, the method of self-study, which forms part of the original concept of peer instruction, could also be applied more widely.

RESPONSE TIMES

The use of clickers has repeatedly been criticised for its consumption of lecture time (Kay/LeSage 2009, Freeman et al. 2007, Caldwell 2007). This investigation suggests, however, that the provision of relatively brief response times is quite sufficient to achieve meaningful results.

Figure 6 shows the distribution of a total of 856 responses to the eight questions over intervals of ten seconds. Most responses were transmitted after 10 to 20 seconds. The increased frequency in the final interval may be explained as follows: Those students who do not know the correct response but who also hesitate to simply guess will tend to use up all the available time (the students were shown the countdown of time) to search their memories for any clues that might permit an informed response after all. The number of responses that were given in the first ten seconds is quite remarkable. Indeed, 76 responses were even transmitted within the first five seconds. Such extremely short response times are attributable to the fact that when introducing some of the questions, the lecturer permitted a few second to elapse between showing the question with its answer choices and starting the countdown.

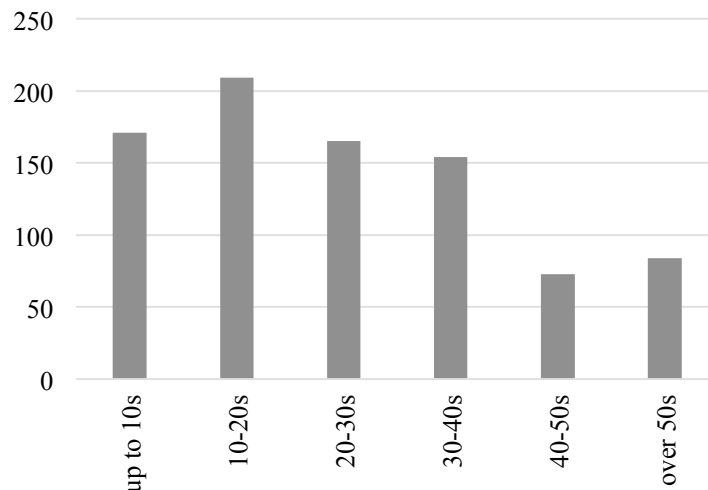


Figure 6. Histogram of response times

Of greater interest though for the purpose of this study is the relationship between the actual response times and the quality of the responses. Comparing the average response time of all correct answers (22.7 seconds) with that of all incorrect answers (28.7 seconds), we find the difference to be highly significant ($t = 5.56$).

This impression is confirmed by Figure 7, which shows the percentage of correct answers in each time interval. The probability of a correct response falls persistently as students take longer to transmit their answers. Once again, the final interval is an exception – and the reason for this could be the same as above: Towards the end of the available time, the students who respond are primarily those who do not know the correct answer but who have at least used the 60 seconds to exclude some choices with the help of what little knowledge they have.

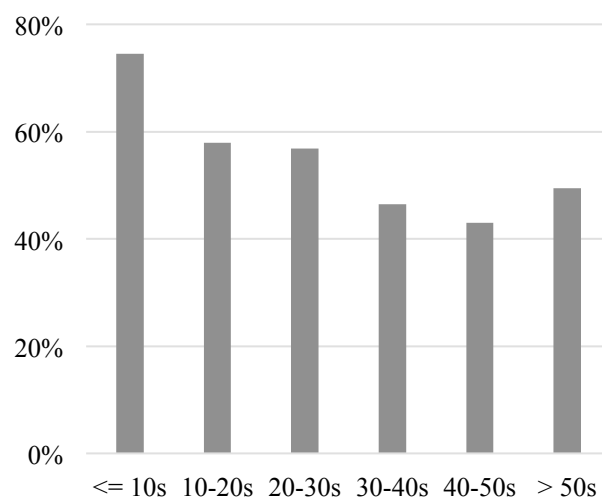


Figure 7. Percentages of correct answers

To support the visual impression of Figure 7 with a statistical test, we ran a probit regression in which a transformation of the (binary) quality of all submitted responses forms the dependent variable. The independent variables consist of the actual response times, their squared values, and seven dummy variables for the lecture-related questions. The detailed results are available upon request and are thus not reproduced here, yet the upshot is quickly summarised: Obtaining highly significant regression coefficients, we find that the likelihood of a correct response falls as response time increases. However, this effect weakens over time and is in fact even reversed for response times in excess of 40 seconds, at which point the probability of a correct response begins to increase again with every additional second that the students take to respond. The regression results thus almost exactly mirror our visual impression.

Yet what does this mean for lecturers who wish to quickly and easily appraise their class? The results suggest that even fairly short periods of available response time suffice for an accurate evaluation of the students' performance. Depending on the length and difficulty of the questions and their associated response options, those who know the correct answer will take no longer than 10 to 20 seconds to read and solve the task. Beyond this time horizon, we likely see an increasing amount of guesswork, which however carries little information value for the lecturer. It ought to be quite possible to conduct a test comprising eight challenging single-choice questions within no more than 15 minutes – including, if desired, a preceding set of sociodemographic questions and the subsequent feedback of the correct responses to the students. Preparing such a test should consume no more than half an hour. With a minimum level of experience, the statistical analysis should take less than two hours. Note that such analysis is called for only once, at the beginning of each term.

CONCLUSION

This article has aimed to provide lecturers with a simple tool to help them appraise a new group of students already at the start of the term and, ideally, to adapt their teaching accordingly. We have shown how clickers, in conjunction with a set of lecture-related questions and a survey of the students' potentially performance-related characteristics, can serve to generate a wealth of valuable information, whose many possible modes of analysis we have only touched upon.

It is not least with respect to our findings regarding the success of peer instruction that the need for further research becomes obvious. While we found that teams outperform individual respondents, it remains unclear whether the improved performance is due to the exchange of arguments or merely to team dynamics, for example in the sense that the opinion of the supposedly more knowledgeable member is unquestioningly adopted for the team response. The authors wish to further pursue this issue in future research by comparing the performance of self-selected and randomly assembled teams.

The influence of response time on performance likewise warrants further analysis. The present study has merely investigated the association between the quality of the answers and the response time actually needed – while the *available* response time remained constant. It would be interesting to see whether – as we have only been able to presume so far – meaningful results could still be obtained if the available time were reduced to, say, 30 seconds. It is also plausible that any team effects will gain importance as the available response time is reduced.

The issues touched upon here thus provide ample scope for future research – the aim always being to achieve, using as little lecture time as possible, the best possible learning outcomes for the students or, depending on the occasion, the best possible insights for the lecturer.

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References

- Caldwell, J.E. (2007). Clickers in the large classroom: Current research and best-practice tips. *Life Sciences Education*, 6(1), 9-20.
- DSW (2014). Studying today in Germany: 20th social survey of Deutsches Studentenwerk on the social dimension of higher education. Berlin: Heinrich Druck + Medien.
- Erdel, B. (2010). Welche Determinanten beeinflussen den Studienerfolg? Eine empirische Analyse zum Studienerfolg der ersten Kohorte der Bachelorstudenten in der Assessmentphase am FB Wirtschaftswissenschaften der Friedrich-Alexander-Universität Erlangen-Nürnberg. *Berichte des Lehrstuhls für Soziologie und Empirische Sozialforschung*. Bericht 2010-2.

- Freeman, M. et al. (2007). Factors affecting educational innovation with in class electronic response systems. *Australasian Journal of Educational Technology*, 23(2), 149-170.
- Jirjahn, U. (2007). Welche Faktoren beeinflussen den Erfolg im wirtschaftswissenschaftlichen Studium? *Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung*, 59(3), 286-313.
- Kay, R.H., LeSage, A. (2009). Examining the benefits and challenges of using audience response systems: A review of the literature, *Computers & Education*, 53, 819-827.
- KMK - Kultusministerkonferenz (2014). Synoptische Darstellung der in den Ländern bestehenden Möglichkeiten des Hochschulzugangs für beruflich qualifizierte Bewerber ohne schulische Hochschulzugangsberechtigung auf der Grundlage hochschulrechtlicher Regelungen [On-line]. Available: www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2014/2014_08_00-Synopse-Hochschulzugang-berufl_Qualifizierter.pdf. (02/23/2015)
- Krüger-Basener, M. et al. (2013). Heterogenität als Herausforderung für Lehrende der angewandten Technikwissenschaft im Teilprojekt Nord. In: M. Bülow-Schramm (Ed.): *Erfolgreich studieren unter Bologna-Bedingungen? Ein empirisches Interventionsprojekt zu hochschuldidaktischer Gestaltung*. Bielefeld: Bertelsmann, 162-190.
- Kundisch, D. et al. (2013). Classroom Response Systems. *Informatik Spektrum*, 36(2), 389-393.
- Mazur, E. et al. (2014). Conceptual question response times in peer instruction classrooms. *Physical Review Special Topics – Physics Education Research*, 10(2), 1-6.
- Mazur, E. (2013). *Peer Instruction: A User's Manual*. Kindle Edition, Boston: Pearson.
- Schmucker, S. (2015). Cognitive activation in mass lectures through electronic voting systems in the lecture theatre. In: *International Conference on Quality in Higher Education - ICQH 2014, Proceedings Book*, Sakarya/Turkey, 67-72.
- Simpson, V., Oliver, M. (2007). Electronic voting systems for lectures then and now: A comparison of research and practice. *Australasian Journal of Educational Technology*, 23(2), 187–208.
- Willich, J. et al. (2011). Studienanfänger im Wintersemester 2009/10. Wege zum Studium, Studien- und Hochschulwahl, Situation bei Studienbeginn. *HIS: Forum Hochschule* 6/2011 [On-line]. Available: www.dzhw.eu/pdf/pub_fh/fh-201106.pdf. (02/23/2015).
- Wielepp, F. (2013): Heterogenität. Herausforderung der Hochschulbildung im demografischen Wandel. In: P. Pasternack (Ed.), *Jenseits der Metropolen*. Leipzig: Akademische Verlagsanstalt, 363-387.

Studying Of 5-Step Learning Process (QSCCS) For Master's Degree Students In Educational Technology And Communications Program, Faculty Of Education, Naresuan University

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ABSTRACT

The objectives of this research were: 1.) to study QSCCS activity performed by graduate students of Educational Technology and Communications program, Faculty of Education; and 2.) to study the opinions of the students concerning the QSCCS activity. The sample was six graduate students of Educational Technology and Communications program, Faculty of Education, who attended the subject of Integrated Technology for Learning Management course in academic year of 2014. Data was collected by using an assessment of behavior of the students concerning QSCCS activity, an assessment of achievement of students concerning QSCCS activity, and a questionnaire asking the students for their opinions concerning QSCCS activity. The data was analyzed to find percentage, mean, standard deviation, t-test statistic, independent t-test, and conclusion of problems and suggestions.

The result of the study of 5-Step Learning Process (QSCCS) by graduate students of Educational Technology and Communications program, Faculty of Education shows that: 1.) graduate students of Educational Technology and Communications program, who attended the subject of Integrated Technology for Learning Management, had higher achievement than before. The statistical significance was .05; and 2.) The overview of behaviors of implementing QSCCS activity was rated as "high" ($\mu = 2.85$, $\sigma = .09$). Once considered all the aspects: S, Learn to Search, the overview was rated as "high" ; C, Learn to Construct, the overview was rated as "high" ($\mu = 2.88$, $\sigma = .14$); C, Learn to Communicate, the overview was rated as "high" ($\mu = 2.92$, $\sigma = .13$); and S, Learn to Serve, the overview was rated as "high" ($\mu = 3.00$, $\sigma = .00$); Q, Learn to Question, the overview was rated as "moderate" ($\mu = 2.46$, $\sigma = .37$).

The opinions of graduate students of Educational Technology and Communications program, who attended the subject of Integrated Technology for Learning Management, concerning QSCCS activity, the overview were rated "mostly agreed" ($\mu = 4.21$, $\sigma = .47$). Once considered all aspects: (1) the first three aspects showed that the aspect that met the highest mean was the one that allowed students to learn on their own ($\mu = 4.67$, $\sigma = .82$); (2) following by the three aspects that were the same mean: implementing QSCCS activity helped creating the environment of learning exchange ($\mu = 4.50$, $\sigma = .55$); implementing QSCCS activity encouraged a more friendly learning environment ($\mu = 4.50$, $\sigma = .84$); and QSCCS activity supported an environment that friends would exchange experiences, knowledge, and attitudes more ($\mu = 4.50$, $\sigma = .55$);

Suggestions of the 5-Step Learning Process (QSCCS) using communication technology, for example, internet and social networks, as learning tools were as following:

1. It decreased the usage of supply resources, for example, paper. It also decreased other costs, for example, travels, software, and buying equipment;
2. It accommodated finding information, by using social networks that had a large database, and organizing the information easier – to explain, the information could be shared to classmates and teachers easily. It could also be ran quickly online, and also be found a lot quicker, too;
3. It supported teamwork. The limitation of time and space was eliminated. Everybody could work together by using a smartphone that had internet access, even though they were not in the same room. Moreover, it also accommodated students to participate in learning activities whenever was convenient for them; and
4. It effected the more effective learning process. It responded students' learning. Lecturers could closely provide suggestions and the learning process became more interesting.

Keywords: Learning Process, Learning activity, 5-step Learning process, QSCCS

STATEMENTS OF THE PROBLEMS

Both instincts of teachers in the past and in the present are to “teach.” Unlike in the new world, the 21st century world, teachers do not have to teach, they help their students think and demonstrate so that students can learn from launching. Teachers are to focus more on getting to know their students, not to teach what is in the course syllabus. Then they have to determine what students are to be given and what skill to be achieved. After that, teachers design the way of learning that the students would have to work on projects and do activities mainly by themselves. Teachers transform from “lecturers” to “coaches” who coach students how to work project for integrated-learning purpose. *Students will learn the best not from teachers putting all the things written in the books in their brains* (Phanit, 2012, p.138-139). From the statement mentioned, you can see that, in 21st century, the world’s situation was definitely different from in 20th and 19th century. Students need skills, e.g., critical thinking, problem solving, creative thinking, communicating, and cooperating. Students are not just receiving information anymore, they need to also be able to analyze information. Similarly, teachers are not just giving knowledge anymore, they become advisors who would ensure that students learn by themselves so that they literally can survive in the nowadays world. These things result that education systems, in all levels, need development and change in accordance to the 21st century world. A system, that encourages students to learn by themselves, needs to be implemented.

Educational Technology and Communications program is an institution that considers the teachings of bachelor, master’s, and doctorate in Educational Technology and Communications program as its main mission. We develop the education programs for all degrees every five years according to the standard of the Office of Higher Education Commission. The development is done in accordance to expand students’ knowledge to what happens in the present (quality assurance document of the program, 2013). Currently, the program has developed courses to respond to the teaching and learning of 21st century. The development of instruction media, which focuses on students who study in this era of information technology, accords what the social needs and being 21st century citizen require. The QSCCS activity can be implemented to or used as a guideline for teaching. QSCCS contains five steps which are: 1. learning to *Question*; 2. learning to *Search*; 3. learning to *Construct*; 4. learning to *Communicate*; and 5 learning to *Serve*. These are the important steps that will lead the students to be knowledgeable. Also the students will have proper skills and attitudes that are needed for being a citizen in 21st century.

According to the statements, researcher would like to implement the QSCCS activity to developing students in Educational Technology and Communications program, Faculty of Education, Naresuan University, in 21st century.

Objectives

1. To study of 5-Step Learning Process (QSCCS) for graduate students in Educational Technology and Communications program, Faculty of Education, Naresuan University.
2. To learn the opinions concerning QSCCS activity on graduate students in Educational Technology and Communications program, Faculty of Education, Naresuan University.

Scope of Study

Population

The sample is six graduate students of Educational Technology and Communications program, Faculty of Education, who were attending the subject of Integrated Technology for Learning Management, academic year 2014.

Research Variables

The independent variable is the QSCCS activity.

The variable is results and opinions from the students concerning the QSCCS activity.

Contents Used in the Experiments

Course 355533 - Integrated Technology for Learning Management

RESEARCH INSTRUMENTS

The research “Studying of 5-Step Learning Process (QSCCS) by Students of Educational Technology and Communications program, Faculty of Education” created a questionnaire in accordance to the type of this research, which was an experimental research. Researchers divided the evaluation form into two types which were:

1. The evaluation form that was used for results of implementing QSCCS activity for undergraduate students of Educational Technology and Communications program.
 - 1.1 Behavioral assessment from implementing QSCCS activity

- 1.2 Achievement assessment of learning both before and after implementing QSCCS activity with Facebook in order to support self-study in 21st century in Integrated Technology for Learning Management
2. The evaluation from concerning opinions that students had towards implementing QSCCS with Facebook in order to support self-study in 21st century in Integrated Technology for Learning Management

Research Conducts

1. Creating Instruments

Steps to create evaluation forms regarding implementing QSCCS

1. Did researches on documents, treatises, journals, and studies that were related to opinions regarding creating evaluation forms for 5-Step Learning Process (QSCCS).
2. Studied on elements of QSCCS that would be implemented to each aspects of learning. Using the information as a framework to determine what were to be evaluated and analyze related documents.
3. Created behavioral assessment concerning implementing QSCCS in Integrated Technology for Learning Management by adjusting the training evaluation that was created by specialists from Faculty of Education. The form was used to evaluate schools in various aspects (*Vareerat Kaew-Urai and team 2013*). It contained 5 aspects which were: 1. learning to *Question*; 2. learning to *Search*; 3. learning to *Construct*; 4. learning to *Communicate*; and 5 learning to *Serve*. The type of the evaluation form was rating scale which contained 22 questions with three levels of questions that were: the behavior happened often by themselves – continuously; the behavior happened sometime by themselves – not continuously, and that behavior happened infrequently from being reminded by someone else – not continuously. The third part was opinions and suggestions.
4. Presented the created training evaluation to three specialists (name listed in Appendix □.) for analyzing the correspondence between the questions and the content. Index of Congruence (IOC) will be calculated. The result of the consideration from the specialists concerning the consistence of the questions and the information was between 0.67 – 1.00 for 22 items.
5. Applied the questionnaire, which was tested by IOC from the specialists, to the samples.
6. Implemented one set of QSCCS to 6 people of the sample.

Steps to create achievement tests for pre/post-study regarding implementing QSCCS

Researchers created an achievement test in order to evaluate the result of implementing QSCCS. In the experiment, there were steps as followed:

1. Studied on principles, ideas, and methods to create the achievement test.
2. Set objectives that were targeted to be the achievement test.
3. Set characters of the achievement test. In this research, researchers set the achievement test as a purpose-covered test in the subject of Integrated Technology for Learning Management. The test contained four-choice questions. Getting the question correctly, one point. If not, none point.
4. Took the created evaluation to related people to correct the information and language in the evaluation.
5. Implementing the edited evaluation to test the achievement level concerning studying.

Steps to create evaluation forms regarding students' opinions toward QSCCS

The rating scale of the evaluation were very high, high, moderate, low, and very low. The 5 rating scales were used to ask 16 questions concerning QSCCS.

2. GATHERING INFORMATION

Gather information from 6 students in the subject of Integrated Technology for Learning Management. The achievement was evaluated since the first class and after implementing QSCCS. The evaluation was finished at the end of the first semester. The steps were:

1. Evaluated achievement of the study by using QSCCS. At the same time, observed behaviors of students in the class. The range of time of the evaluation was the whole first semester.
2. Once each unit of study was finished, QSCCS would be implemented in order to get ideas of test result from the students.
3. Then evaluated occurred behaviors by following steps of QSCCS, using the developed learning evaluation.
4. Evaluated students' opinions by implementing QSCCS

5. Analyzed the achievement test, evaluation form regarding implementing QSCCS, and questionnaire that were answered, then concluded the result accordingly.

3. ANALYZING INFORMATION

1. QSCCS Evaluation

Researchers analyzed the information by using strategic analyzing program. Mean and standard deviation were analyzed. All information and caption were presented. Three Likert Scale were set for rating, which are:

High	=	3
Moderate	=	2
Low	=	1

After that, way of interpreting score was set by adjusting the criteria of converting the group average of (Boonchom Srisa-ard, year 2010: 121) which were:

Mean of 2.51 – 3.00 means that the behavior often happen, continuously;

Mean of 1.51 – 2.50 means that the behavior sometimes happens, not continuously;

Mean of 1.00 – 1.50 means that the behavior seldom happens, not continuously.

2. The achievement tests for pre/post-study regarding implementing QSCCS. The results will be compared by using t-test Dependent.
3. Evaluation form for students' opinions concerning QSCCS. To analyze the information, researchers worked on the analyzing as followings: analyzed total score of all the answers and calculated mean and standard deviation. Qualitative data with QSCCS was presented. Researchers checked and analyzed the answered questionnaire by using a program. Five Likert Scale were implemented as:

5	means	"Mostly Agreed"
4	means	"Very Agreed"
3	means	"Moderately Agreed"
2	means	"Less Agreed"
1	means	"Least Agreed"

Then set the interpreting criterion of score as:

Mean of 4.50 – 5.00 means "Mostly Agreed"

Mean of 3.50 – 4.49 means "Very Agreed"

Mean of 2.50 – 3.49 means "Moderately Agreed"

Mean of 1.50 – 2.49 means "Less Agreed"

Mean of 1.00 – 1.49 means "Least Agreed"

CONCLUSIONS

1. Learning achievement of six students concerning the subject of Integrated Technology for Learning Management was higher for post-study than pre-study. The significance was .05
2. Score of behavior concerning implementing QSCCS of graduate students of Educational Technology and Communications program, Faculty of Education, as a whole, was high ($\mu = 2.85$, $\sigma = .09$). After considering all aspects, it was found that Q (Learning to Question) part was moderate ($\mu = 2.46$, $\sigma = .37$), S (Learn to Search) part was high ($\mu = 3.00$, $\sigma = .00$), C (Learn to Construct) part was high ($\mu = 2.88$, $\sigma = .14$), C (Learn to Communicate) part was high ($\mu = 2.92$, $\sigma = .13$), and S (Learn to Serve) part was high ($\mu = 3.00$, $\sigma = .00$)
3. Student's opinions concerning implementing QSCCS with Facebook for supporting in self-study in 21st century in Integrated Technology for Learning Management subject. The overview was high ($\mu = 4.21$, $\sigma = .47$). After considered three aspects respectfully, it was found that the aspect that had the highest mean was allowing students to study by themselves ($\mu = 4.67$, $\sigma = .82$), following by three aspects equally which were implementing QSCCS activity to help creating the environment of learning exchange ($\mu = 4.50$, $\sigma = .55$), implementing QSCCS activity to encourage a more friendly learning environment ($\mu = 4.50$, $\sigma = .84$), and implementing QSCCS activity to encourage an environment that friends would exchange experiences, knowledge, and attitudes ($\mu = 4.50$, $\sigma = .55$). There were two aspects that share the third highest mean, which were, explanation concerning the content of QSCCS activity and its learning process ($\mu = 4.33$, $\sigma = .82$), and the overview of implementing QSCCS activity in the classroom ($\mu = 4.33$, $\sigma = .52$).

Concluding problems and suggestions concerning implementing QSCCS by using communication technologies, e.g., internet and social network, as a teaching instrument, it was found that:

1. It became economical concerning usage of paper, paying for transportation, including purchasing office supply and soft wares.
2. It accommodated more concerning finding information in the internet, which contained wide database. Also, filing, sharing, and looking information up were done more easily, because of it was systematically stored.
3. It supported cooperation between peers, without concerning distance and time difference. That was because of internet could be accessed at all times on smart phones. Students were also able to work on their assignments at their convenience.
4. Helped increasing the efficiency of studying and learning. It answered the need of teachers and learners. Teachers could advise learners more closely. It also made learning activity more interesting.

DISCUSSION

The result of implementing QSCCS activity by graduate students of Educational Technology and Communications program, Faculty of Education, Naresuan University, showed interesting topics to be discussed as followings:

1. Learning achievement of students in Integrated Technology for Learning Management subject was higher in post-study than pre-study. The significance was .05. That was possibly because of the self-studying way that was implemented, teachers were only to give advices. That would encourage students' potentiality to learn.
2. The overview of behaviors concerning implementing QSCCS was high ($\mu = 2.85$, $\sigma = .09$), which were S: Learn to Search, C: Learn to Construct, C: Learn to Communicate, and S: Learn to Serve. That was because the QSCCS activity encouraged students to change and share in a good way, and to gain leadership to develop way of learning together. Especially, this method was emphasized on the ways of doing rather than the consequences, which was the reason why the learning achievement result was obvious. At the same time, the result was not highly different, yet, all the aspects were obviously changing. That was consistent with Karunyaphol Viwatthamongkol's research in year 2010. The research found that the way that advisors closely advised students would affect how students manage their way of learning.
3. The result of studying on students' opinion concerning QSCCS in Integrated Technology for Learning Management subject, the overview was "mostly agreed" ($\mu = 4.21$, $\sigma = .47$) The aspects that had the highest mean were: allowing students to study by themselves; creating the environment of learning exchange; encouraging a more friendly learning environment; and encouraging an environment that friends would exchange experiences, knowledge, and attitudes. The following result allowed students to improve the learning skill that focused mainly on learners and also encouraged students to have the potentials it would take to be citizens in 21st century, in accordance to the policy of the Ministry of Education. The policy would like students to come up with new ways of thinking, learn by themselves, gain life skills, and learn how to seek new knowledge from various sources. It was also consistent with the pleasant of Ratnoppakao (year 2013) that implemented coaching and mentoring system to a learning environment. The result was that students were satisfied with the system to "Mostly Satisfied" level.

Suggestions

Suggestions from the result

1. More follow-ups on learning behaviors should have been done all year. The behaviors should have been recorded and observed, so that, we know more strictly about the changing process.
2. Evaluating themselves and by their friends should gained us more information concerning how to develop learning activities.

Suggestions for future researched

Studying on implementing QSCCS with social networks should be done, in order to satisfy the way of learning in 21st century.

References

- Wiwanthamongkon, K. (2010). *Development in Coaching and Mentoring for Advisors for Applying Local-level Curriculum Framework to Classes of Teacher Trainees*, Doctorate of Education Thesis, Silpakorn University, Nakhon Pathom.
- Srisa-ard, B. (1998). *Statistical Methods to Researching I, Second Edition*. Mahasarakham: Department of Basic Education, Faculty of Education, Srinakharinwirot University, Nakhon Pathom.
- Srisa-ard, B. (2010). *Introduction to Researching, Eighth Edition*. Bangkok, Suweeriyasarn Co., Ltd.

- Noppakao, R. (2013). *Reporting on Learning Management by Coaching and Mentoring System, Geography, European Unit, Grade 2*. from <http://www.bankeng.ac.th/bk/images/stories/2556/PDF/□□□□□□□□.pdf>
- Phanit, W. (2012). *The Way of Creating Learning Method in 21st Century*. Bangkok: Sodsri-Saritwong Foundation.

Teachers' Evaluation Of Supervision Practices In Terms Of Their Professional Development

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ABSTRACT

The purpose of educational supervision is to address teachers' professional deficiencies for achievement and to provide the necessary support teachers by knowledge and skill acquisition and professional development. It is thought to be worth studying to define what extent this aim is achieved. The aim of this study is to discover newly graduated teachers' opinions about whether supervisions contribute to their professional development and to unearth their recommendations about what could be done to support teacher professional development. The study is based on a qualitative research and data was collected through face to face interviews with 15 branch teachers. Descriptive analysis was used to analyse data. Findings reveal that a) teachers need supervision but not current practices of supervision deviated from the principles and understanding of contemporary supervision, b) teachers are complaining about not finding instructional leadership behaviours which is very important for their profession. The teachers suggest that supervision contributing to professional development should provide feedback, should be based on good human relations and should be school centred practice conducted collaboratively.

INTRODUCTION

Teachers are the crucial part of successful education and supervision helps teacher to gain the necessary knowledge in order to be successful, to develop their skills and to enhance their professional development (Glickman, Gordon, Ross-Gordon, 1998). Teachers who are recent graduates feel excited to start their professional lives, take on various tasks, dedicate themselves to their students and make a change in students' lives but their expectations and aspirations are rarely met. These newly graduated teachers resign in their first or second year of career and those who continue to work face negative experiences in general and they cannot perform the role of educator (Gordon and Maxey, 2000). The difficulties teachers face in their early career years are often related to the competencies of teachers or the teacher education programs whereas the role of supervision is rarely cited as a reason.

One of the most important problems newly graduated teachers face is how their professional development can be supported. Teachers see their first years of experience as a trial and error process due to their lack of experience (Glatthorn, 1984). Beginning a teaching profession is perceived as a challenging struggle (Huling-Austin, 1990) and teachers feel alone when they have to fulfil their duties due to the lack of planning, supervision and interaction with their colleagues (Odell & Ferraro, 1992). Robinson (1998) emphasizes that the enthusiasm of teachers, their hard work and the support they receive from experienced teachers and managers can help teachers overcome the difficulties they experience in the early years of their profession. One of the most reliable ways of supporting teachers' professional development is to monitor teachers, to assess them and to provide professional guidance on the necessary topics and issues. Monitoring teachers' classroom performance and providing feedback and assessment to teachers are argued to make a difference in teachers' professional development (Marshall, 2009).

Previous research has emphasized the importance of supervision for developing in-class learning (Aydm, 2005; Glickman, Gordon & Ross-Gordon, 2005; Oliva & Pawlas, 2001; Pajak, 1993; Sergiovanni & Starratt, 1998; Sullivan & Glanz, 2000; 2005; Waite, 1995; Wiles & Bondi, 1996; Zepeda, 2006a; 2006b). A well conducted supervision enhances teachers' teaching practices, strengthens teachers and improves teachers' learning. One way to achieve this is to provide feedback to the observed teacher. Teachers' progress is to a great extent related to the quality of feedback. Research shows that while teachers want to get feedback regarding their practices they can rarely have access to such feedback or information that could help them develop their skills and strengthen their performance (Sergiovanni and Starratt, 1998; Sullivan & Glanz, 2005).

The process of supervision should be a collaborative endeavour through which teachers can reveal their professional concerns and anxieties. Researchers (Beach & Reinhartz, 2000; Glatthorn, 1990; Glickman, Gordon, & Ross-Gordon, 1998; Sergiovanni & Starratt, 1998) stress that teachers could conduct a collaborative

effort with the participation of all partners in the process of supervision and emphasize the importance of such a project. Long term supervisions are usually carried out in order to see whether the curriculum is being implemented or to find out whether a number of basic skills are acquired by the teachers. Therefore, many teachers are reluctant to ask help from the supervisors as they think that asking help would be considered as a sign of weakness and would lead to a poor grade in their assessment (Ebmeier and Nicklaus, 1999). When, however, contemporary organisations changed within the course of time the conventional approaches to management and supervision perceptions started to lose their functionality and appeal. Therefore, there are many different alternatives for teacher supervision..

While Ebmeier and Nicklaus (1999) see supervision as an educational tool, existing practices decrease the collaboration between colleagues and the solidarity between teachers and supervisors. Sergiovanni and Starratt (1998) redefine supervision as a more democratic and professional process and as an exercise in which both teachers and supervisors can employ and develop their skills. Teachers' preferences and choices regarding supervision vary. Some teachers prefer to work independently whereas some like getting feedback about their work (Augustyn, 2001). In order educational supervision to be advanced, the relationship between professional development and supervision should be developed (Dollansky, 1997). Professional development is meaningful as long as it is congruent with the needs of teachers (Jonasson, 1993).

In recent years, various methods are being used by principals for teachers' professional development (Marshall, 2009):

- ✓ A more dynamic supervision and assessment
- ✓ The use of exams' results to assess teachers
- ✓ Paying more the teachers who have a better performance
- ✓ Revising teacher' evaluation forms and making the necessary changes
- ✓ Providing feedback to staff by visiting schools
- ✓ Ensuring that teachers can benefit from the example of teachers and schools with high performance
- ✓ Ensuring that teachers examine and analyse studies of students
- ✓ Ensuring that teachers use a curriculum set in detail.
- ✓ Providing all students with laptops
- ✓ Encouraging teachers to use the internet so as to have access to different materials and interesting ideas on teaching
- ✓ Forming discussion groups for teachers to read relevant books and journal articles
- ✓ Ensuring that teachers join courses and workshop in and outside the school

Every single method tried for teachers' professional development can improve the education quality under the right circumstances. However, Greene (1992) argues that a more effective and strong process of supervision is necessary in order to enhance the education and teaching facilities and to decrease attainment parity (Greene, 1992).

Marshall (2009) lists the properties of a strong supervision as follows:

- ✓ Having a shared perspective with principals and teachers on the education and teaching functions.
- ✓ School principal's observation of classroom teaching
- ✓ Principals' taking notes down a number of important points for consideration after classroom visits
- ✓ Principals' providing feedback to teachers on the necessary points to be developed by teachers
- ✓ Teachers' use of this feedback to improve their classroom performance
- ✓ Increasing students' achievements (Marshall, 2009).

When all these steps are completed successfully, supervision and evaluation will be an important force for development. However, personal weaknesses, bureaucracy, personal dynamics and rigid policies are usually a barrier to conduct supervision and evaluation in line with the above criteria.

Marshall (2009) lists a number of reasons for which supervision and evaluation are not being conducted:

- ✓ Principals can only observe a small part of instruction and teaching.
- ✓ Teachers perform their duties only to impress others.
- ✓ The visit of principals to the classroom affects the classroom dynamics.
- ✓ A number of skills and a certain level of education are required in order to make a syllabus or a course plan.
- ✓ A syllabus of high quality can overshadow the big picture.
- ✓ Many supervision tools are not flexible and they are strictly attached to regulations and therefore they cannot provide useful feedback.
- ✓ The use of check lists and rating based on quantitative criteria prevents teachers from understanding the essence of supervision and does not support teachers' development.
- ✓ Critical assessments can discourage teachers from further educating themselves or they can make adults feel ignorant about education and training.

- ✓ The process of supervision can lead to segregation and jealousy among teachers.
- ✓ Some principals feel that they cannot avoid bad or mediocre teaching
- ✓ School principals are often disturbed by assessment processes.
- ✓ Supervision focuses more on pleasing management than on focusing on teaching and educational practices.

School managers can only observe a teacher's class once a year. A teacher has in total 900 hours of teaching during one academic year (180 working days-5 hours per day). Therefore, supervisors observe only the 0.1% of the total class hours. In the remaining 99.9% of time, the teacher is alone with students. It is not effective to observe only one class of a teacher who teaches 900 hours during an academic year and the assessment which is based on one class observation cannot present a holistic picture about a teacher's performance. In other words, teachers should have a more intensive supervision. There are, for example, principals who provide feedback to teachers, make plans for their professional development, take a close interest in their teachers and students and communicate with their teachers. Yet, such managements are rare.

THE STUDY

Purpose of this research is to discover newly graduated teachers' ideas about whether supervisions contribute to their professional development and to unearth their suggestions about what could be done to enhance professional development. To serve these aims, following research question are sought to be answered:

1. What do teachers think about supervision?
2. How should supervision contribute to teachers' professional development?
3. How a better supervision could be carried out to contribute to professional development?

METHOD

This study adopts a qualitative research approach which enables the researcher to describe and analyse an individual's ideas and experiences in verbal terms rather than in numerical terms. Qualitative research is an approach that prioritizes researching and understanding a social phenomenon in its related environment (Fraenkel ve Wallen, 2009; Hancock, 1998; Yıldırım ve Şimşek, 2008). In the research, a "phenomenology" design was used to unearth individuals' perceptions and reactions about a phenomenon. Phenomenology is used to explain the world we live in, including cases, experiences and concepts. Phenomenology studies may not always provide explanatory definitions yet they create awareness about an issue and help us understand phenome. (Fraenkel ve Wallen, 2009; Hancock, 1998). In this respect, a qualitative approach was preferred in order to explore teachers' evaluation, expectations, experiences and opinions about the supervision.

The participants of this research are 15 branch teachers (4 men and 11 women) who were working in Ankara-Altındağ in secondary schools during the spring term of the 2012-2013 academic year. For the selection of participants, the study used the criterion sampling method which is categorized under purposive sampling. Experience has been used as a criterion for purposive selection in order to find what teachers, who are recent graduates and teachers who are in their first 5 years of experience, think. Therefore, participants with 1 to 5 years of teaching experience were chosen.

Table 1. Profile of Participants

Code of participants	Field of teaching	Gender
T1	Turkish	F
T2	Science	F
T3	Turkish	F
T4	Turkish	M
T5	English	F
T6	English	F
T7	Turkish	M
T8	Science	M
T9	Turkish	F
T10	English	F
T11	Special Education	F
T12	English	F
T13	Science	F
T14	Technology and Design	M
T15	Early Childhood Education	F

Data was collected through semi-structured interviews which allow a researcher to obtain more systematic and comparable data from different individuals (Fraenkel ve Wallen, 2009; Hancock, 1998; Yıldırım ve Şimşek, 2008, 121-122). In the process of forming data collection tools, a question pool regarding supervision was formed drawing largely from the literature. To ensure the content validity of the data collection tools, the opinion of experts was asked about the questions so as that the study could produce valid and reliable results. In particular, to ensure content validity 3 lecturers were asked to look at the questions and then a final interview protocol was produced in the light of the provided feedback. In order to understand whether the semi-structured interview protocol was clear enough for the participants, it was tested on two teachers who did not participate in the focus group interviews. The interviews with these two teachers showed that the questions were clear and comprehensible.

Data was collected between April and May 2013 in Altındağ district of Ankara through face to face interviews with teachers. Interviews were conducted when teachers were at school and took place in teachers' rooms. They lasted between 25 and 30 minutes. It was paid attention that during the interview no other person was in the room except from the participant and the researcher. All interviewees gave their consent about being recorded and therefore all interviews were audio-recorded. Later on, the interviews were transcribed.

Descriptive analysis was employed for data analysis. Initially, the transcripts which contained the data were read several times. Subsequently, the statements that were not related to the topic of research were removed. Then, the statements that were relevant for the research questions were gathered in order to address the sub-questions of this research. The statements' frequencies are provided followed by a detailed analysis of the data which also included quotations from teachers' answers.

FINDINGS

This section presents the results of the analysis of the ideas of teachers who are in their early career years (1-5 years of experience) about the relationship between supervision and professional development. Findings did not aspire to give all the data obtained from teachers but rather aimed to present data that could answer the main research question.

Teachers' views about current supervision practices

Teachers had in general the same view about supervision practices. When asked if they need supervision, 11 teachers replied with 'yes' or 'conditionally yes'. This means that supervisions were seen necessary but they held a common belief that the supervision were not properly done. When principles of supervision are considered (Beycioğlu ve Dönmez, 2009; Aydın, 1993; Başar, 1993), supervision should be purposeful, objective, clear, constructive, collaborative, and democratic and should take the existing conditions into consideration. Yet teachers' statements indicate that supervisions were not conducted in accordance with the aforementioned principles. As teachers expressed, ambiguity during the supervision create fear and anxiety:

"Supervision should not create fear and anxiety. When you say supervision, I cannot help thinking of if I did something wrong" (T11)

"I do not think that people who inspect me are objective or do their jobs properly." (T3)

"There is an understanding among teachers that supervisors come from ministry, they will inspect us, find our weaknesses and leave the school." (S14)

Environment of trust form a basis for teacher participation, division of responsibility, contributing efforts and motivation needed for the targeted changes and development in supervision. The above mentioned quotations highlight teachers' concerns that supervisors may not be impartial with people (principle of objectivity) and may not explain clearly what is expected from teachers (principle of specification).

Another issue teachers mostly emphasized about supervision practices is that they believe supervisors do not inspect teachers long enough to have an idea about themselves or to evaluate their performance. Teachers expressed their concerns as follows:

"I do not think two-hour- supervision would contribute much to me" (T10)

"It is difficult to understand the quality and performance of a teacher in 40 minutes." (T12)

"That person (inspector) cannot have an idea about my personal development in 2 hours" (T3)

"Inspector only comes for 15 minutes..." (T8)

"A person who inspects me for only one hour cannot really know who I am. I may pretend to be someone else in that hour" (T14)

Hoy and Miskel (1978) stressed that in professional supervision the decisions taken by supervisors and the provided guidance should be knowledge based. Moreover, in order to obtain reliable and valid information about

the supervised and the teachers to be able to make informed judgements about themselves, there should be sufficient time allocated for observation.

The question of “what is supervised” is also a commonly mentioned issue by teachers. Teachers expressed their ideas on this issue as follows:

“I don’t find supervisions are useful because they are old fashioned and it is only of paperwork. Supervision is all about checking and inspecting documents and paper. They ask if you have board of branch teachers’ documents or that document or this document.” (T1).

“When you say supervision, people check the documents. They don’t inspect what I do or my work”. (T2)

“It is all about documents. If there is a missing document, they ask where it is.” (T3).

“Supervision has become a routine process in which files are checked and classes are observed only passingly” (T6).

Teachers’ statements showed that supervision is based on a very narrow examination of teachers rather than taking teachers’ overall performance into consideration. Although some documents can work as an evidence of teachers’ performance, contemporary education supervision should aim to provide support for professional development. Teachers statements pointed out that although necessary information were collected about teachers’ performance, they were not shared with them and therefore teachers perceived the examination made under the name of supervision as ‘document supervision’.

Teachers’ views about the contribution of supervision to professional development

Majority of teachers (11 teachers) believed that there was not a connection between supervisions and professional development. Only four teachers stated that there could be a relationship between supervision and professional development yet almost all emphasized that this relationship was not supported by current practices. It is surprising to see that teachers made similar and limited statements about the sort of benefits supervision provide for professional development. Teachers shared the idea that they did not benefit from the supervision in terms of professional development; on the contrary they were negatively affected by it.

Teachers’ ideas focused on three issues. First of all, supervisors only explained teachers how to fill required documents and the learning as limited to this. As T15 express:

“I learned how to fill the documents but supervision did not contribute to my classroom practices.”(T15)

This implies that the inspector gave an impression that the most important aim of supervision is to “examine documents” or “to arrange documents”. The above statement showed us that teacher expected a contribution regarding classroom practices and prioritized such contributions.

Secondly, contribution to professional development was very much related to the time allocated to a teacher. One teacher of the teachers expressed her concerns as follows:

“He observes my lesson for only one hour and what kind of contribution he can make to my development.” (T3)

In other words, allocating sufficient amount of time to teachers for their professional development, providing opportunities and space for teachers to share their experiences, having a common assessment of teachers’ practices, and emphasizing teachers’ strengths are quite important steps for teachers’ support and encouragement.

Thirdly, teachers expressed their ideas about revision and development of supervision aspect (Başar,1993). Teachers’ expressions below showed that their common emphasis about supervision was that they did not get feedback about themselves:

“I did not feel like I had any professional development because he just listened to my course and left.” (T5).

“They do supervision only but nothing happens after that.” (T13).

The most important contribution supervision can make to profession is to create enthusiasm in teachers for personal development and to participate in the process in order to understand and develop it (Aydın, 1993). It should also serve to expand teachers’ views and perspectives about their profession.

Teachers' views and opinions about a contributing supervision

Teachers offered different ideas about how a supervision could be carried in a way that it could contribute to their professional development. Teachers mostly drew from their experiences about supervision and stressed on what should not be done in a supervision. For instance, teachers' statements below indicated that they found supervision practices **conventional and useless** and put forth that the change in supervision mentality should be in this direction.

"Supervisors should leave old-fashioned thinking behind." (T1).

"Supervision should focus on teaching practices, not on documents." (T4).

"If supervision is carried out with tools that emerged twenty years ago healthy results will not come out. Today's requirements are different. We are now in the age of computers. Any supervision ignoring this is not a proper supervision." (T7).

After teachers had defined supervision practices as *conventional and useless*, they also stressed that supervision should be **guiding, goal oriented and problem solving** with following quotations:

"I don't want a grade or a point in supervision rather I prefer to be observed in a relevant way that could guide me" (T10)

"There should be a supervision; it should be constructive and problem solving. They should supervise to solve problems. (T13).

Another frequently mentioned point about supervision by teachers is the **contingency** principle. Contingency principle argues that observed behaviours can produce different results in different times and places (Başar, 1993). A teacher's following expression emphasized that assessment should be conducted taking the environment of supervision into consideration:

"In the assessment the teaching conditions should be taken into consideration. But this does not happen. They should even congratulate us for working under these difficult and tough conditions." (T2)

Teachers also suggested a paperwork that would not create workload for them during supervision process. One teacher's statement below can be given as an example for this:

"I don't want supervisors to come to school frequently. They should not come just for the sake of visiting or just in order to create problems. A tradition from old times still continues: the "official report". You have to present all the things you do in class within an official report but education is not like that. You cannot record every single thing or moment in education because education and teaching is a process that is constantly being experienced rather than having tangible results. This mentality is wrong. They should come but they should come to help and support us. Supervision should not focus on looking for a mistake or for checking whether the required documentation is correct. These are very wrong. (T3)"

One teacher expressed need for **feedback** after supervision by saying *"It should be a supervision that will address the deficiencies"* (T15) whereas two teachers emphasized a **motivating** supervision mentality:

"It should be motivating" (T2)

"There should be constructive criticisms not hurting or destructive criticism." (T6).

Good human relations and **communication** also appeared as a suggestion that could create a contributing supervision mentality. Teachers expressed their opinions on this as follows:

"Supervision should be carried out in a long span of time. In a sincere and warm environment, they could tell us how they will assess and evaluate us and they could express their ideas regarding the positive or negative aspects of our work. There could be a different approach." (T9).

"Talking requires foremost communication skills. An effective supervision could be realized through the appropriate communication. (T1)." "

"It would be better if we could establish a process of dialogue among supervisors and teachers." (T9).

Interaction is important but does not mean anything on its own. Interactions should also include professional issues.

Another mentioned issue is the necessity of collaborative study. One of the teachers said: *“If supervisions were a collaborative study, it could be even better (T1)”* whereas another teacher expressed as follows:

“Supervision should be a collaborative work. There could a collaborative work in any case or situation.” (T3)

As Bilir (1999) expressed supervision is a cooperation rather than a process of searching for a weakness or mistake. Teachers’ statements approve this judgement.

Holistic approach is another topic teachers used to define contributing supervision mentality.

“Teacher should take place in supervision process. I think teachers should be in the process from beginning to the end. Teachers should be in entire process of supervision.” (T4)

“In the end, education is holistic because teacher, principal, inspector, director of national education, provincial director or national educations are all in education and all have different contributions. There can be cooperation between supervision and teachers.” (T7)

Thus teachers’ ideas assume that supervision can be effective if carried out in a collaborative approach inclusive of all stakeholders.

Regarding supervision practices, **colleague supervision** is an additional issue that teachers emphasized

“The interaction among teachers are more effective” (T2).

A final point teachers emphasized is **school centred** supervision.

“School supervision should come into prominence. Not supervisors of provincial national education but schools should help teachers.” (T1)

“Supervision should only be carried out with the help of the principals and supervisors should respect principals.” (T4)

“The role of principals’ supervision should be increased.” (T7)

“School principals are always at schools and they have the opportunity of tracking what teachers do or how they work. The supervisors may not have the chance to know the teachers, given the limited amount of time but when supervisors are together with school principals, a better judgment can be formed about a teacher. I think it is better in that way.” (T8)

Above statements present that central supervision is not enough and supervision by school principal could be more effective.

CONCLUSIONS

School is an organisation in which social, cultural, political and economic functions of educational institutions are performed. This means that the schools have a responsibility of helping the various social groups of society to achieve their goals and of determining, assessing and developing the social contribution of each group. Otherwise, schools will deviate from their aims and the performance of employees and the mission of raising up the next generation of citizens will be negatively affected. Therefore teachers’ ideas about *how teachers are supervised, whether this supervision can contribute to professional development and how a better supervision can be provided* are important. In this study, teachers’ ideas on these three issues were obtained through face to face interviews and analysed.

In this study, teachers expressed their need for supervision; however, they pointed out that **current supervisions** do not align with contemporary supervision principles and understanding. Teachers stated that current practices arouse fear and anxiety in them and that supervisors do not carry out long enough supervision process that could give an idea about the performance of teacher. Lastly, they expressed that supervisions were not objective and the aim of supervision was not clear. These negative ideas can be argued to be closely related to each other.

The fact that supervisors do not allocate enough time for the supervision of teachers and the assessment of their performance (Özbek, 1997; Sarpkaya, 2004; Thobega and Miller, 2003) cause supervisors’ not being able to decide on the topics of guidance for teachers. Even if they decide on the issues requiring attention, it causes the level of guidance not to be at the desired level (Sarı, 2006; Yıldırım, 2007; Can and Gündüz, 2012). For instance, research of Demir (2009) supported this finding and showed that teachers expected a seminar or a conference from supervisors and wanted to be informed on student motivation, assessment and evaluation and reducing future anxiety of students. However, the study revealed that teachers were not provided sufficient **guidance** on such issues.

Brief supervision process does not provide a reliable and valid judgement about teacher and therefore, it shadows the objectivity of the decision about teacher. Likewise, many research findings (Bozkurt, 1995; Kartal, 1997; Yılmaz, 1998; Dağlı ve Akyıldız, 2009) pointed out that teachers did not find supervision practices **objective**. Teachers think that supervisions forms had several shortfalls, the content of the form was not at an adequate level for evaluation (S. Şahin, 2005) and these forms did not give a sufficient evaluation (Yılmaz, 1998).

The finding that teachers were not sure what was expected of them in supervision is congruent with the research findings of Şahin, Çek ve Zeytin'in (2011). It could be argued that arbitrariness and personality dominate supervision. Based on these views, it is obvious that "goal-oriented supervision" principle of contemporary supervision was not complied with. Taking teachers' concerns into consideration, it can be seen that another supervision principle was not followed either; this is principle that "effective supervision should be conducted in a healthy environment free from oppression and stress". This finding showed consistency with the study results of Kazak (2013) and Akşit (2006). The finding of "supervision was limited with paperwork and limited duration of supervision" in research of Kazak (2013) confirms the opinions of teachers in this study.

Supervision should provide **professional development**, make concrete suggestions about improving classroom activities and should help teachers realize their weaknesses or mistakes (Obiweluzors, 2013) but teachers in this study complained that they cannot get any of these support. A good supervision should give teachers an opportunity to show their skills and thus should diagnose what sort of support they need and provide necessary contribution and reinforcement for professional development. In contemporary education supervision, the aim is to contribute learning-teaching process by developing teachers' teaching behaviours (Kartal, 2013). Inspector, in this sense, is seen as someone as the leader who improves education (Burnham, 1976) and therefore, supervisors' instructional leadership is significant. However, the results of this research showed that teachers thought that current supervision practices were not effective for professional development. Teachers expressed that supervisors focused on filling the required forms, made short supervisions and did not provide feedback about teacher actions.

Regarding the question of how a supervision should be organised in a way that could contribute to professional development, teachers expressed that supervision should first be free of conventional structure and process, and rather it should be guiding, goal-oriented problem solving. They also noted that paperwork should be decreased and provided feedback should be increased. They emphasized that good human relations, cooperation and healthy communication was also necessary for a contributing supervision. Another significant finding is that teachers considered colleagues' supervision or school centred supervision as a more acceptable supervision.

All these findings argue that supervision practices are not goal-oriented or problem solving and they also do not contribute to teachers' professional development. In this respect, it could be suggested that people who will inspect or supervise (supervisors or principals) should have pre-service training and should be trained fully equipped. Additionally, school managers and colleagues should provide a fair and constant supervision process which meets the needs of teachers.

References

- Akşit, F. (2006). Performans değerlendirmeye ilişkin öğretmen görüşleri (Bigadiç İlköğretim Öğretmenleri Örneği). *Sosyal Bilimler Araştırmaları Dergisi*, 2, 76-101.
- Altunışık, R., Coşkun, R., Bayraktaroğlu, S., ve Yıldırım, E. (2010). Sosyal Bilimlerde Araştırma Yöntemleri SPSS Uygulamalı (6. Baskı). Sakarya: SakaryaYayıncılık.
- Augustyn, G. J. (2001). Teacher supervisory preferences. Unpublished master's thesis. University of Saskatchewan, Saskatoon, Saskatchewan, Canada.
- Aydın, İ. (2005). Öğretimde denetim. Ankara: Pegem A Yayıncılık.
- Aydın, M. (2011). Çağdaş eğitim denetimi (6. Baskı). Ankara: Hatipoğlu Yayınevi.
- Başar, H. (2000). Eğitim denetçisi. Ankara: Pegem Yayıncılık.
- Beach, D. M., & Reinhartz J. (2000). Supervisory leadership: focus on instruction. Boston: Allyn and Bacon.
- Beycioğlu, K., & Dönmez, B. (2009). Rethinking educational supervision. *Inonu University Journal of the Faculty of Education*, 10(2), 71-93.
- Bilir, M. (1991). Türk eğitim sisteminde teftiş alt sisteminin yapı ve işleyişi, Unpublished doctoral thesis. Ankara Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.
- Bozkurt, E. (1995). İlköğretim okullarında ders denetimi uygulamalarının değerlendirilmesi. Unpublished master thesis. Ankara Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.
- Burnham, R. M. (1976). Instructional supervision: past, preset and future perspectives, *Theory and Practice*, 15(4).
- Can, E., ve Gündüz, Y. (2012). İlköğretimde çalışan öğretmenlerin, il eğitim denetmenleri ve okul müdürlerinin

- yapmış olduğu rehberlik çalışmalarından yararlanma düzeylerinin incelenmesi. 7. Ulusal Eğitim Yönetimi Kongresi Bildiri Kitapçığı, 24-26 Mayıs, Bildiri No: 106; 172-173, Malatya.
- Carr, J. F., Herman, N., & Harris, D. E. (2005). *Creating dynamic schools through mentoring, coaching and collaboration*. Virginia: Association for Supervision and Curriculum Development.
- Dağlı, A. ve Akyıldız, S. (2009). İlköğretim öğretmenlerinin görüşlerine göre ilköğretim denetmenlerinin etik davranışları. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, 13 (2009): 27-38.
- Demir, M. (2009). İlköğretim müfettişlerinin ders teftişlerinin öğretmenler tarafından değerlendirilmesi. Unpublished master thesis. Yeditepe Üniversitesi, Sosyal Bilimler Enstitüsü, İstanbul.
- Dollansky, T. D. (1997). *Rural Saskatchewan, an elementary K-6 teachers' perceptions of supervision and professional development*. Unpublished master's thesis, University Of Saskatchewan, Saskatoon, Saskatchewan, Canada
- Ebmeier, H., & Nicklaus, J. (1999). The impact of peer and principal collaborative supervision on teachers' trust, commitment, desire for collaboration, and efficacy. *Journal of Curriculum and Supervision*, 14(4), 351-378.
- Fraenkel, J.R., & Wallen, N.E. (2009). *How to design and evaluate research in education (Seventh edition)*. New York: McGraw-Hill.
- Glatthorn, A. A. (1984). *Differentiated supervision*. Virginia: Association for Supervision and Curriculum Development.
- Glickman, C. D., Gordon, S. P., & Ross-Gordon, J. M. (1998). *Supervision of instruction: a developmental approach*(4th ed.). Boston: Allyn and Bacon.
- Glickman, C. D., Gordon, S. P., & Ross-Gordon, J. M. (2005). *The basic guide to supervision and teaching leadership*. Boston: Allyn-Bacon.
- Gordon, S. Ve Maxey, S. (2000). *How to help beginning teachers succeed (Second edition)*. Virginia: Association for Supervision and Curriculum Development.
- Greene, M. I. (1992). Teacher supervision as professional development: does it work? *Journal of Curriculum and Supervision*. Winter 7(2), 131-148.
- Gündüz, Y. ve Balyer, A. (2011). Eğitim denetiminde alternatif yaklaşımlar. *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, 33, 61-78.
- Hancock, B. (1998). *An Introduction to Qualitative Research*. Nottingham: Trent Focus Group.
- Hawkins, P., & Smith, N. (2006). *Coaching mentoring and organizational consultancy supervision and development*. New York: Open University Press.
- Hoy, W., & Miskel, C. G. (1978). *Educational Administration, Theory, Research and Practice*. New York: Random House.
- Huling-Austin, L. (1990). Teacher induction programs and internships. In R. Houston (Ed.), *Handbook of research on teacher education* (pp. 535-548). New York: Macmillan.
- Jonasson, H. (1993). Effective schools link professional development, teacher supervision, and student learning. *The Canadian School Executive*, 13(2), 18-21.
- Kartal, S. (2013). Türk eğitim sisteminde teftiş sürecinin yeniden yapılandırılması ve bir model önerisi. IV. Uluslararası Katılımlı Eğitim Denetimi Kongresi, 31 Mayıs- 2 Haziran 2012, Muğla.
- Kartal, S. (1997). İlköğretim ikinci kademe branş öğretmenlerinin teftiş-rehberlik etkinlikleri hakkındaki görüşleri. Yayınlanmamış yüksek lisans tezi. Gazi Üniversitesi, Eğitim Bilimleri Anabilim Dalı, Ankara.
- Kazak, E. (2013). Ders denetimindeki uygulama farklılıklarına ilişkin öğretmen görüşleri. *Anadolu Eğitim Liderliği ve Öğretim Dergisi*, 1(1), 15-26.
- Marshall, K. (2009). *Rethinking teacher supervision and evaluation*. California: Jossey-Bass.
- Obiweluozor, N., Momoh, U., & Ogbonaya, N. O. (2013). Supervision and inspection for effective primary education in Nigeria: strategies for improvement. *Academic Research International*, 4(4), 586-594.
- Odell, S. J., & Ferraro, D. P. (1992). Teacher mentoring and teacher retention. *Journal of Teacher Education*, 43, 200-204.
- Oliva, P. F., & Pawlas, G. E. (2001). *Supervision for today's schools (5th ed.)*. New York: Longman.
- Özbek, B. (1998). İlköğretim II. kademe ders denetimi sorunları (İzmir ili örneği). Yayınlanmamış yüksek lisans tezi. Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Eğitim Bilimleri Anabilim Dalı, İzmir.
- Pajak, E. (1993). *Approaches to clinical supervision: alternatives for improving teaching*. California: Corwin Press.
- Robinson, G. W. (1998). *New teacher induction: a study of selected new teacher induction models and common practices*. Paper presented at the annual meeting of the Mid-Western Educational Research Association, Chicago, IL.
- Sarı, D. (2006). İlköğretim müfettişlerinin ilköğretim öğretmenlerince değerlendirilmesi (Pendik İlçesi Örneği).Yayınlanmamış yüksek lisans tezi, TODAİE.
- Sarpkaya, R. (2004). İlköğretim denetmenlerinin denetim sürecinde karşılaştıkları sorunlar. *SDÜ Burdur Eğitim Fakültesi Dergisi*, 8, 114-129.

- Scherer, M. (1999). A better beginning, supporting and mentoring new teachers. Virginia: Association for Supervision and Curriculum Development.
- Sergiovanni, T. J., & Starratt, R. J. (1998). *Supervision: a redefinition* (Sixth Edition). New York: McGraw-Hill.
- Sullivan, S., & Glanz, J. (2000). Alternative approaches to supervision: case from the field. *Journal of Curriculum and Supervision*, 15 (3), 212–235.
- Sullivan, S., & Glanz, J. (2005). *Supervision that improves teaching-strategies and techniques* (Second Edition). California: Corwin Press.
- Şahin, S. (2005). İlköğretim okullarında uygulanan öğretmen teftiş formlarının yeterliliğinin değerlendirilmesi (Gaziantep ili Şahinbey ilçesi örneği). *Fırat Üniversitesi Sosyal Bilimler Dergisi*, 15 (1): 113-124.
- Şahin, S., Çek, F. ve Zeytin, N. (2011). Eğitim müfettişlerinin mesleki memnuniyet ve memnuniyetsizlikleri, *Kuram ve Uygulamada Eğitim Yönetimi*, 17(2), 221-246.
- Thobega, M., & Miller, G. (2003). Relationship of instructional supervision with agriculture teachers' job satisfaction and their intention to remain in the teaching profession. *Journal of Agricultural Education*, 44(4): 57-66.
- Yıldırım, G. (2007). Sosyal bilgiler öğretmenlerinin ders denetimine ilişkin görüşleri (Denizli ili örneği). Yayınlanmamış yüksek lisans tezi, Muğla: Muğla Üniversitesi Sosyal Bilimler Enstitüsü.
- Yıldırım, A., & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (6. Baskı). Seçkin Yayınevi: Ankara.
- Yılmaz, K. (2009). Okul müdürlerinin denetim görevi. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*. 10(1), 19-35.
- Yılmaz, M. (1998). İlköğretim okullarında ders teftişinde karşılaşılan sorunlar. Unpublished master thesis, Ankara Üniversitesi Sosyal Bilimler Enstitüsü Eğitim Bilimleri Anabilim Dalı, Ankara.
- Waite, D. (1995). *Rethinking instructional supervision: notes on its language and culture*. London: Falmer Press.
- Wiles, J., & Bondi, J. (1996). *Supervision: a guide to observation*. Englewood Cliffs, NJ: Merrill, Prentice Hall.
- Zepeda, S. J. (2006a). High stakes supervision: We must do more. *International Journal of Leadership in Education*, 9 (1), 61–73.
- Zepeda, S. J. (2006b). Supervision. In F. W. English (Ed.). *Encyclopedia of educational leadership and administration*. (ss. 978–980). California: SAGE.

Teachers' Opinion Regarding Smart Board Applications In Science Education

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ABSTRACT

The aim of this research is to determine the contributions of smart board applications to the process, the difficulties encountered in learning – teaching environment with teachers' opinions. In this research which teachers' opinions on smart board applications are analyzed, data collection and analysis of data is held according to qualitative research. This research is survey model. Physics, Chemistry, Biology and Mathematics at secondary education schools, in which smart board applications are enforced, voluntarily participate to this research. In the scope of this research, teacher survey is used as a data collection tool. Survey form developed by researchers consists of two sections. When first section consists of personal opinions about teachers, second one consists of open-ended questions. Themes are formed according to teachers' opinions given to open-ended questions. In the analysis of data formed according to these themes, descriptive analysis, one of the qualitative analysis, is used. According to the results obtained, solution recommendations will be made related to the difficulties encountered and problems in the smart board applications which are accepted as an intriguing technology for a student and is also helpful for learning

Keywords: Smart Board, Interactive Teaching, Science Education

1. INTRODUCTION

The use of instructional technologies in science and mathematics classes has helped move the classes away from the traditional perspective. Smart boards defined as interactive boards have been introduced to the educational institutions as a digital learning with this perspective (Higgins, Beauchamp & Miller, 2007; Solvie & Kloek, 2007; Pamuk, Çakır, Ergun, Yılmaz & Ayas, 2013). Smart boards are one of the most important tools concerning the effective use of information technologies in learning and teaching environment. Smart boards are composed of three basic components as well as including different types in terms of equipment. These components are a software concerning educational content, a computer and a projector (Smith, Higgins, Wall, & Miller, 2005; Yücel, Orhan, Mısırlı, Bal & Şahin, 2010; Sünkür, Arabacı & Şanlı, 2012). In the literature, there are both teachers' and students' opinions concerning the educational use of smart boards in primary and secondary schools and studies concerning the motivation and attitudes of students against smart board applications (Emre, Kaya, Özdemir & Kaya, 2011; Al-Qirim, 2011; Skutil & Maněnová, 2012; Türel, 2012). Moreover, there are studies in which the negative and positive effects of smart board applications on education have been carried out. Negative effects observed in studies which have been carried out with primary school students and teachers concerning smart board applications have rather emerged in technological dimension (Wall, Higgins & Smith, 2005; Hennes, 2007; Somyürek, Atasoy & Özdemir, 2009; Northcote, Mildenhall, Marshall & Swan, 2010). The positive effect is that students have been able to interact with the smart board and manage the smart board by using its technological features. As for the teachers, they have been able to structure the activities related to the subject and concepts (Levy, 2002; Becta, 2006; Beauchamp, 2004).

2. PURPOSE OF THE STUDY

This research has been carried out with the aim of evaluating the opinions of Biology, Physics, Chemistry and Mathematics teachers concerning smart board applications.

Within this scope, there have been sought answers to the questions below.

1. Do teachers have enough knowledge about the use of smart boards?
2. What are the problems encountered in smart board applications?
3. How do the teachers evaluate the significance of the use of smart boards in learning – teaching environment?

3. METHOD

This research has been carried out by using survey model of qualitative research design as a base. In the research, it has been aimed at receiving teachers' opinions concerning smart board applications.

3.1. Sample

The population of this research is composed of schools which use smart board applications in science and mathematics classes. The sample of the research is composed of 50 Biology, Physics, Chemistry and Mathematics teachers who work at private and public schools in Ankara, Amasya and Karaman. 27 of these teachers work at public high schools and 23 of them work at private schools. Descriptive statistics concerning teachers have been given in Table 1.

Table1. Descriptive statistics concerning teachers in sample

		N	%
Gender	Woman	17	34
	Man	33	66
Total		50	100
Branch	Biology	10	20
	Physics	8	16
	Chemistry	8	16
	Mathematics	24	48
Total		50	100
The length of service	0-5 years	3	6
	6-15 years	22	44
	16-25 years	25	50
Total		50	100

The participants in this research are composed of 48% of Mathematics teachers and 52% of Biology, Physics and Chemistry teachers. When the length of service in Table 1 have been examined, it has been observed that teachers who have worked for 6-15 years are 44% and teachers who have worked for 16-25 years are 50%.

3.2. Data Collection Tool

In this research, "Smart Board Application Opinion Questionnaire" has been used as a data collection tool. Questionnaire has been developed by researchers. At the preparatory stage of the questionnaire, studies related to the subject have been examined first. The questions prepared have been broached to experts. Then, the questionnaire form has been prepared. There are six demographic questions, six multiple-choice questions and three open-ended questions in the questionnaire form.

3.3. Analyzing Data

During the analysis process of this research, sub-themes have been formed as a result of opinions obtained from the survey questions. Frequency tables have been created according to these themes.

4. FINDINGS

The findings of this research have been discussed according to sub problems. Accordingly, survey results concerning the question of "Do teachers have enough knowledge about the use of smart board applications?" in the first sub problem have been given in Table 2.

Table 2. Descriptive statistics of teachers concerning smart board applications

		Public School		Private School		Total	
Themes		N	%	N	%	X	%
The efficient use of smart boards	Expert	8	30	11	48	19	38
	Advanced	18	67	11	48	29	58
	Basic	1	4	1	4	2	4
Total		27	100	23	100	50	100
In-service training for smart boards	Yes	24	89	10	43	34	68
	No	3	11	13	57	16	32
Total		27	100	23	100	50	100
Encounter with problems	Yes	19	70	19	83	38	76
	No	8	30	4	17	12	24
Total		27	100	23	100	50	100

The teachers who have reported that they are expert at the efficient use of smart boards are 48% at private schools and 30% at public schools. 67% of the teachers who work at public schools are able to use the smart boards at advanced level. According to this result, it can be said that teachers who work at private schools are rather more efficient at using smart boards than those who work at public schools. The rates of in-service training concerning the use of smart boards are 89 % at public schools and 43% at private schools. According to these results, the effective use of smart boards in classes is expected to be higher at public schools. However, the effective use of smart boards have been higher at private schools. The reason is thought to be the fact that each class has the capability of having smart boards at private schools while only laboratories have smart boards at public schools. According to the results of the sub titles concerning problems encountered in the use of smart boards, the rates are 70% at public schools and 83% at private schools. According to these results, the rate of the problems encountered concerning the use of smart boards in both types of the schools is seen to be high.

Themes formed out of teachers' opinions related to the question of "What are the problems encountered in smart board applications?", the second sub problem of the researcher, have been given in Table 3.

Table 3. Themes concerning problems encountered in smart board applications

Themes	Public School		Private School		Total	
	N	%	N	%	X	%
Ones who have not encountered any problem	7	26	5	22	12	24
Technical problems	9	33	9	39	18	36
Loss of time concerning the preparatory stage	8	30	5	22	13	26
Lack of document concerning subjects	3	11	4	17	7	14
Total	27	100	23	100	50	100

According to Table 3, it has been seen that the incidence of problems encountered in smart board applications is similar at both public schools and private schools.

Some of the problems encountered in smart board applications have been given below.

“Appropriate program selection, programs' not being free of charge. Lack of prepared activities or their being unsuitable to the class. Lack of internet. Screens of smart boards getting hanged. Programs' not working properly. Computer-board problems. The length for preparing the board at the start of the class. The vision sometimes gets poor and its sharpness decreases. The opening and preparing of the board take time. This time for opening and closing the board causes time loss because of the class system. The projector is bad for eyes. It is hard to find prepared presentations. Updating, calibration and technical problems. Late opening, not opening any kind of application, difficulty in using the buttons, not supporting 3D.

Themes formed out of opinions related to the question of "How do the teachers evaluate the significance of the use of smart boards in learning and teaching environment?", the third sub problem of the research, have been given in Table 4.

Table 4. Themes concerning the evaluation of smart board applications

Themes	Public School		Private School		Total	
	N	%	N	%	X	%
Viewless	2	7	1	4	3	6
In terms of application	7	26	6	26	13	26
In terms of visibility	17	63	15	65	32	64
In terms of process	1	4	1	4	2	4
Total	27	100	23	100	50	100

In the evaluation of smart board applications, the highest rate in themes concerning positive features has been represented "in terms of visibility" (Table 4). Visibility comes into prominence as being 63% in public schools and 65% in private schools. Positive opinions in terms of application is at lower rate.

Some of the teachers' opinions concerning positive features of smart board applications have been given below.

"I approve them in terms of showing the experiments which are hard to be carried out in laboratories. Using visuals in biology classes has made it easier for students to understand the concepts. It also makes it easier for students to understand geometry in visual areas. Images and videos enrich the subject. More questions may be examined. More questions are being solved. It provides practicality for graphic drawing. As the questions are already written on the board, less time is taken. When students get bored, animations gather their attention and it can be used in 3D. The subject gets easier to grasp when supported with animations. Visuals gather the attention. It makes learning easier and eases the burden of teacher".

5. DISCUSSION

The effective integration of smart board application to learning environment has been carried out by having considered the positive features of this technology. In this research, positive opinions concerning the use of smart board applications in science classes can be collected under three titles, which are "in terms of application", "in terms of visibility" and "in terms of process". When evaluated in terms of application, smart board is interactive and visibility is at the forefront. Therefore, student is able to include himself/herself to the application more easily. It also helps the teacher. In terms of process, it increases the motivation of the student. It makes learning easier. It makes easier for learner to include himself/herself to the learning activities. Teachers give more place to the questions related to evaluation. It helps save time for treating subjects in the program.

When problems that teachers and students have encountered in smart board applications are examined, those problems come into prominence: 1. technical problems 2. waste of time concerning preparatory stage 3. lack of document concerning subjects. Therefore, these problems cause teachers to have negative attitudes concerning smart boards. In this research, only one of the teachers has stated that smart boards do not have any contribution. Technical problems are thought to be the cause of this negative opinion. In the literature, it has been reported that there is not any decrease in attitudes albeit problems encountered in applications by teachers (Kennewell & Morgan, 2003). It has been underlined that teachers approve of the use of this technology despite the fact that smart board negatively affects the preparatory stage of the class. In this research, there are also some drawbacks which are not one of the teachers' opinions but are given in the literature. These drawbacks are mentioned as being health problems caused by long term usage of this technology, problems concerning the prevention of the use of the smart board because of the improper infrastructure planning and investments for smart boards from shoe-string budget (ctd: Sünkür, Arabacı & Şanlı, 2012).

When teachers' opinions about the question of "What should be done for smart board application to be efficiency?" are examined, basic opinions underlined are that subject contents should be appropriate for smart boards and teachers should be able to add content to the prepared activities. Moreover, it is thought that students should be able to reach the contents which have been prepared for smart boards. In smart board application, the preparatory stage for the class causes loss of time. This situation has been mentioned by teachers as one of the problems concerning smart boards. It is thought that there should be teacher class systems rather than class systems in order to prevent loss of time originating from the preparatory stage for each class.

6. SUGGESTIONS

The significance of the effect of Information and Communication Technology on structure and functionality is underlined in studies carried out. These technologies are included to the process with the aim of contributing to the improvement of the learner's some skills. However, the inclusion of technology to the process is not enough.

The use of instructional technology designed in compliance with constructive understanding requires a certain infrastructure, technical equipment and knowledge. Therefore, teachers should be provided with in-service training seminars with the aim of the effective and efficient use of smart boards in classes. At these seminars, the subjects should be theoretical and practical. New equipment systems and softwares related to the technology being used should be presented and training should be given for its use. In this way, the teacher will not only know about smart board technology but also have the skills to use this technology. What more has come into prominence in teachers' opinions are the situations observed concerning learning-teaching process. This view is about the subject contents being suitable to the smart boards or about the enrichment of available applications suitable to subject contents and their being applicable for change. In the literature, it has been reported that teachers use the technologies that they have used during their undergraduate education at the schools they work (Lambdin, Thomas & Moore, 1997). Therefore, instructional technologies should be included to the teaching practices at institutions that train teachers. Activities that have been learned during the undergraduate education and that have been put on trial are thought to be a model for candidate teacher during his/her career.

References

- Al-Qirim, N. (2011). Determinants of interactive White board success in teaching in higher education institutions. *Computers & Education*, 56, 827-832.
- Beauchamp, G. (2004). Teacher Use of the Interactive Whiteboard In Primary Schools: Towards an Effective Transition Framework Technology. *Pedagogy and Education*, 13(3), 327-348.
- Becta, (2006). Teaching Interactively with Electronic Whiteboards in the Primary Phase. Retrieved October 18, 2009 from <http://publications.becta.org.uk/download.cfm?resID=25918>, (Retrieved: December 21, 2011).
- Emre, I., Kaya, Z., Ozdemir, T.Y. & Kaya, O. N. (2011). Effects of Using Interactive Whiteboard on Pre-service Science Teachers' Achievement in Topic of Structure of Cell Membrane and Attitudes toward Information Technology. *6th International Advanced Technologies Symposium (IATS'11)*, Elazığ, Turkey.
- Hennes, C., (2007). The effectiveness of the interactive whiteboard in k-12 schools. from <http://eportfolio.cathyhennes.com/writing/samples/eng301-07termpaper.pdf> [Retrieved: 18.05.2011].
- Higgins, S., Beauchamp, G. & Miller, D. (2007). Reviewing the literature on interactive. Whiteboards. *Learning, Media and Technology*, 32(39), 213–225.
- Kennewell, S., & Morgan, A. (2003). "Student teachers' experiences and attitudes towards using interactive whiteboards in the teaching and learning of young children". In J. Wright, A. McDougall, J. Murnane, & J. Lowe (Eds.), *Young children and learning technologies* (pp. 71-76). Sydney: Australian Computer Society.
- Lambdin, D. V., Thomas, M. D. & Moore, J. A. (1997). Using an interactive information system to expand preservice teachers' visions of effective mathematics teaching. *Journal of Technology and Teacher Education*, 5(2/3), 277-290.
- Levy, P. (2002). Interactive Whiteboards in Learning and Teaching in Two Sheffield Schools: A Developmental Study. Department of Information Studies University of Sheffield. From <http://dis.shef.ac.uk/eirg/projects/wboards.html> [Retrieved: 01.06.2011].
- Northcote, M., Mildenhall, P., Marshall, L., & Swan, P. (2010). Interactive Whiteboards: Interactive or Just Whiteboards? *Australasian Journal of Educational Technology*, 26(4), 494-510.
- Pamuk, S., Çakır, R., Ergun, M., Yılmaz, H. B. & Ayas, C. (2013). The Use of Tablet PC and Interactive Board from the Perspectives of Teachers and Students: Evaluation of the FATİH Project. *Educational Sciences: Theory & Practice*, 13(3), 1799-1822.
- Skutil, M. & Maněnová, M. (2012). Interactive whiteboard in the primary school. *Environment. International Journal of Education and Information Technologies*, 1(6), 123-130.
- Smith, H. J., Higgins, S., Wall, K. & Miller, J. (2005). Interactive whiteboards: boon or bandwagon? A critical review of the literature. *Journal of Computer Assisted Learning*, 21, 91–101.
- Solvie, P., & Kloek, M. (2007). Using technology tools to engage students with multiple learning styles in a constructivist learning environment. *Contemporary Issues in Technology and Teacher Education*, 7(2), 7-27.
- Somyürek, S., Atasoy, B. & Özdemir S., (2009). Boards IQ: What Makes a Board Smart?. *Computers & Education*. 53,368–374.
- Sünkür, M., Arabacı, I. B. & Şanlı, O. (2012). Secondary Part Of Elementary Schools Students' Views Toward Smart Board Practices (Malatya City Sample). *e-Journal of New World Sciences Academy*. 7(1), 313-321.
- Türel, Y. K. (2012). Teachers' Negative Attitudes towards Interactive Whiteboard Use: Needs and Problems. *Elementary Education Online*, 11(2), 423-439. (Online: <http://ilkogretim-online.org.tr>).
- Wall, K., Higgins, S. & Smith, H. (2005). 'The Visual Helps me Understand the Complicated Things': Pupil Views of Teaching and Learning With Interactive Whiteboards. *British Journal of Educational Technology*. Vol 36, No5, 851-867.
- Yücel, K., Orhan, N., Mısırlı, G., Bal, G. & Şahin, Y. G. (2010). An Improved Interactive Whiteboard System: A New Design and an Ergonomic Stylus. 2010 2nd international Conference on Education Technology and Computer (ICETC), V3, 148-152.

Teachers' Views On Favourism And Its Implications In Educational Organizations

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ABSTRACT

The current study aims to investigate the views of teachers on favourism in educational institutions, and also elaborates on how favourism is reflected in schools and in the feelings of teachers. The study has a qualitative methodology. The participants of the study were 17 teachers working in formal secondary and high schools in Ankara-Altındağ during the spring term of 2013/14 academic year. The participants had at least 10 years of experience. The study used the criterion sampling method which is categorized under purposive sampling for the selection of participants. Therefore, the year of experience was used as a criterion for purposive selection. The data was collected by semi-structured interviews and descriptive analysis was used for data analysis. The findings showed that favourism exists in every level of the Turkish educational system; favourism is mostly practiced by teachers' union and school principals; cronyism is the most common type of favourism reported by teachers; and favourism mostly affects educational processes. The study also presents that favourism arouses feelings of injustice, inequality, rage and anger in teachers. The research suggests that there is a need to increase awareness of decision-makers at every level of educational system on favourism, and the principles of transparency and accountability should be adopted.

INTRODUCTION

Each society in the course of time develops and applies an administrative mentality of certain characteristics which is distinctive and unique to a particular culture (Dyer, 2006). Yet, some societies' cultural characteristics may show similarities. For instance, in Eastern societies "collectivism" is a common cultural feature. Collectivism defines "welfare, happiness and peacefulness of a particular group or a family" (Gorodnichenko & Roland, 2012; Hofstede & Hofstede, 2005) and makes itself apparent in society when the interests of a group are valued above anything else for the sake of ensuring general welfare.

In this respect, favouritism practices can be argued to emerge in order to protect interests of a group through illegal ways with the influence of collectivism. Favouritism is generally seen as an unprofessional practice as it includes behaviours that do not fit to the rules and ethics of professional life (Abdalla, Maghrabi & Raggad, 1998). Favouritism is a phenomenon that appears when decision makers take decisions about members of organisation in accordance with their personal beliefs rather than knowledge, skills and qualifications of the members. So, top managers in organisations may exclude some of the members of organisation when making decisions on promotion, distribution of tasks, change of duties, assessment of performance, distribution of rewards, and professional development opportunities (Bassman & London, 1993) or they may prioritize or prefer certain people or groups on the basis of criteria they value. Favoured people and groups have better opportunities or are welcomed more regardless of assessment or performance criteria within the organisation (Basu, 2009).

The most frequent three types of favouritism in organisations are as follows: (1) favouritism of relatives (nepotism), (2) favouritism of friends (favourism), (3) political favouritism (cronyism). Favouritism of relatives (Nepotism) is the preferential treatment of relatives on the basis of kinship by blood rather than taking efficiency, experience, and education and communication skills of employees into consideration (Padgett & Morris, 2005; Wong & Kleiner, 1994). Research on the impact of nepotism on employees show that nepotism leads to loss of job satisfaction among employees (Araslı, Bavik, & Ekiz, 2006; Asunakutlu & Avcı, 2010; Büte, 2011a, 2011b; Hernandez & Page, 2006; Laker & Williams, 2003; Reich & Reich, 2006; White, 2000), increases employees' turnover intentions (Araslı, Bavik, & Ekiz, 2006; Araslı & Tümer, 2008; Büte, 2011a), job stress (Araslı & Tümer, 2008; Büte, 2011a, 2011b; Mahamatjan Kyzy, 2011), and conflict among employees (Hernandez & Page, 2006; Okyere-Kwakye, Nor & Nor, 2010), and decreases work oriented self-sufficiency (Sullivan & Mahalik, 2000; White, 2000), job performance (Keller, t.y.; Reich & Reich, 2006), and organisational commitment (Abdalla, Maghrabi, Raggad, 1998; Büte, 2011b; Düz, 2012; Ford & McLaughlin, 1986; Uğurlu & Üstüner, 2011; Van der Heyden, Blondel & Carlock, 2005). It also causes emergence of a much stronger authoritarian structure (Sünneli-Erden, 2014), decreases perception of organisational justice (Karacaoğlu & Yörük, 2012; Laker & Williams, 2003; Mearawi, 2010; Polat, 2012; Polat & Kazak, 2014; Spranger, Colarelli, Dimotakis, Jacob & Arvey, 2012; Uğurlu & Üstüner, 2011) and organisational trust (Keleş,

Özkan & Bezirci, 2011; Mearawi, 2010). In addition, nepotism also prevents the effective supervision of employees (Weber, 1946, cited in year, 2006, p. 254), the participation of non-family members in the decision making process (Hayajenh, Maghrabi & Al-Dabbagh, 1994; Kets de Vries, 1993) and perception of these practices as a threat to their careers by employees who are family members (Nelton, 1998). Finally, it works as an obstacle in the promotion of qualified people to managerial positions (Ciulla, 2007; Nelton, 1998).

Moreover, recruitment based on kindredship also prevents organisational development (Yeung, 2000 cited in Finelli, 2011), leads to perception of inequality among employees (Ateş, Sözen & Yeloğlu, 2014), and push employees to strengthen their communication and ties only with employees who are family members (Araslı, Bavik & Ekiz, 2006). This eventually cause ineffective reward or bonus systems (Sabancı, 1999, akt., Yıldırım, 2008), and loss of organisations' respectability (Şişman&Arı, 2009) and objectivity (İyışlıeroğlu, 2006). Nepotism felt within organisation not only affects the existent employees but also potential employees (Araslı, Bavik & Ekiz, 2006).

On the other hand, some research show that kindredship based favouritism could also lead some positive outcomes. Nepotism, at the same time, is argued to increase jobs satisfaction and thus job performance of employees (Basu, 2009; Bellow, 2004; Sadozai, Zaman, Marri & Ramay, 2012), create competitive environment among family members and keeps the organisation alive (Abdalla, Maghrabi & Raggard, 1998). It also shortens the process of recruitment (Hernandez & Page, 2006), increases organisational commitment (Nelton, 1998), provides a successful connection from one generation to the other (Danco, 1982, cited in Finelli, 2011), forms a sense of solidarity and the instinct of belonging among employees (Wong & Kleiner, 1994; Molofsky, 1999, cited in Finelli, 2011) and finally it provides an opportunity for younger members of the family to learn the business life and nature of business (Dyer, 2006). However, contrary to several research which show that there is a positive or a negative correlation between nepotism and job satisfaction, Chandler (2012) did not find a meaningful statistical correlation between two variables.

Studies show that the disadvantages nepotism brings to the organisation outweigh the advantages (Finelli, 2011; Ford & McLaughlin, 1986). For this reason, several measures have been taken to prevent nepotism. Elbo (1998) argues that employers' meticulous attitudes in recruitment process from the very beginning can negatively affect nepotism perception in the organisation. Dökümbilek (2010) found out that employees who are family members are not fired even if their performance are constantly low but rather they are issued verbal/written warning or assigned to another position. For this reason, human resources departments of companies should be transparent and objective in order to prevent conflict among employees (Bellow, 2004; Finelli, 2011; Rabin-Margalioth, 2006) and they should also treat all employees equally (Morrissey, 2006). Not allowing close member of families to work in the same office or department is also noted as an important step to prevent nepotism (Coil & Rice, 1995; Laker & Williams, 2003; Podgers, 1996; Reed & Cohen, 1989).

On the other hand, some other research indicated that precautions taken to prevent nepotism can bear some negative outcomes within the organisation. For instance, a company which has adopted the policy of not employing any family members cannot be said to treat every candidate equally. It disadvantages a family member who has the necessary experience, education and skills (Reed & Cohen, 1989). Moreover, practices such as not allowing partners to work in the same department and company may force one of the partners to leave the job leading thus to serious promotion problems (Padgett & Morris, 2005). Lastly, in businesses where there are policies against nepotism, even if family members are recruited fairly, employees may still think that nepotism still exists and that family members have still preferential treatment (White, 2000).

The second favouritism type is favouritism of friends and acquaintances (favourism). This sort of favouritism is preferential treatment of friend or acquaintances in recruitment and promotion process (Araslı & Tümer, 2008). Loewe et al., (2008) defines favouritism in two ways; in its general meaning, it is an act of favouring a person or a group of people and in its specific meaning, it is the act of favouring friends or acquaintances from personal relationships. Favourism is also act of showing better treatment or tolerating to some employees just because they are friends or acquaintances (Davoli, 2008). In some countries, favouritism based practices are very common in recruitment of civil servants (Şişman & Arı, 2009) and the reasons for this are stated as (1) lack of alternatives (2) lack of enforcement towards favouritism, (3) societal norms and (4) political structure (Loewe, Blume & Speer, 2008). Favouritism of friends and acquaintances is also argued to increase employees' job stress (Araslı & Tümer, 2008), negatively affect the job satisfaction and increase turnover intentions (Araslı, Bavik & Ekiz, 2006; Araslı & Tümer, 2008).

The last type of favouritism is political favouritism (cronyism). Cronyism is partiality to people who share similar political ideology by recruiting, promoting or appointing them to higher positions regardless of their

qualifications (Hernandez & Page, 2006). Cronyism is understood by employees as an unfair and unethical practice of recruitment (Khatri&Tsang, 2003). This situation causes employers to be seen as a dishonest and partial person who is engaged in illegal practices by employees (Begley, Khatri & Tsang, 2009). Like other types of favouritism, cronyism decreases employees' perception of self-efficacy and job performance (Erdem, 2010; Khatri & Tsang, 2003) and increase job stress (Araslı&Tümer, 2008) and employees' turnover intentions (Araslı&Tümer, 2008; Karataş, 2013). It is also reported to affect the job satisfaction (Araslı&Tümer, 2008; Erdem, 2010; Karataş, 2013) and organisational commitment negatively (Khatri&Tsang, 2003), and decrease organisational trust (Polat, 2013). In order to avoid negative consequences of cronyism, a transparent and a structured rewards system could be introduced, competitive job environment could be strengthened and people with leadership skills could be appointed to managerial positions (Begley, Khatri&Tsang, 2009).

In summary, there are different favouritism practices; nepotism is based on kinship whereas favouritism and cronyism are based on a preferential treatment towards friends and political friendships respectively. A common point among all these types of favouritism is that there is a relationship based on self-interest and a common network and that there is a third person or group that is negatively affected by these practices (Mahamatjan Kyzy, 2011). Favouritism and its impact within the organisation is a highly researched topic around the world. However, there are very few studies that use qualitative methodology to look into types of favouritism-nepotism, favourism and cronyism. In this respect, this study aims to find out whether there are any favouritism practices in educational institutions by conducting interviews with teachers who have at least 10 years of teaching experience and work at secondary level of schools. Thus, the research aspires to contribute to the literature by filling above mentioned void. The study also finds out the types of favouritism and how favouritism is reflected in schools and in the feelings of teachers.

METHOD

Research Design

This study is based on a qualitative research methodology, which aims to examine a phenomenon in detail (Creswell & Clark, 2007; Fraenkel & Wallen, 2006) and has employed case study. Merriam (2009) defines case study as an analysis or a detailed definition of a particular case, phenomenon or social unit. Case studies are studies of an actual phenomenon in its own environment. They are generally used in cases when there is not a certain boundary between a phenomenon and the context and when there is more than one evidence or more than one source of data (Yin, 2009). In other words, case studies are based on the questions of "why?" and "how?" and are preferred more when a case or phenomenon needs to be scrutinised or examined in detail (Yin, 2009).

The embedded case study was adopted for this research. Embedded case study assumes that there is more than one sublayer or units in one case (Şimşek & Yıldırım, 2013). In this study, the case that is dealt with is whether teachers have encountered various forms of favouritism or nepotism and if so how this situation have been reflected to the organization.

Participants

Participants of the research are 17 teachers who were working in either a secondary school or a high school in Ankara-Altındağ during the spring term of 2013-2014 academic year. The study used the criterion sampling method which is categorized under purposive sampling for the selection of participants. Therefore experience has been used as a criterion for purposive selection and participants who have at least 10 years of teaching experiences are asked to participate in the study. Experience is taken as a criterion in this study as it is thought to be an important variable in affecting teachers' experiences and ideas. Looking at a period of 10 years or more can provide more data and examples on issues of favouritism and nepotism. Therefore, participants are respectively determined on the basis of their experience, gender and field of teaching. In this regard, 4 teachers have 10 years, 1 teacher has 11 years, 5 teachers have 12 years, 2 teachers have 13 years, 4 teachers have 14 years and 1 teacher has 15 years of experience. Participants' ages range between 32 and 44. Study is conducted with teachers who belong to 8 different fields of teaching.

Based on the findings of research on favouritism, teachers' membership to a union is also regarded as an important variable. Profile of participants is presented in Table 1.

Table 1: Profile of participants

Code of the participant	Years of Experience	Field of teaching	Gender	Level of education	Membership to a Union
T1	11	Turkish Language and Literature	F	Bachelor's Degree	Member
T2	14	Mathematics	F	Bachelor's Degree	Member
T3	15	Physics	M	Bachelor's Degree	Member
T4	12	English	M	Postgraduate Degree	Not Member
T5	10	English	F	Bachelor's Degree	Not Member
T6	14	Mathematics	M	Bachelor's Degree	Member
T7	12	Physical Education	M	Bachelor's Degree	Member
T8	14	Chemistry	F	Bachelor's Degree	Not Member
T9	10	Social Sciences	F	Bachelor's Degree	Not Member
T10	14	Turkish Language and Literature	M	Bachelor's Degree	Member
T11	12	English	F	Bachelor's Degree	Not Member
T12	13	Turkish Language and Literature	F	Bachelor's Degree	Member
T13	12	Social Sciences	F	Bachelor's Degree	Not Member
T14	13	Computer	M	Bachelor's Degree	Member
T15	10	Turkish Language and Literature	F	Bachelor's Degree	Member
T16	12	Chemistry	M	Bachelor's Degree	Member
T17	10	Turkish Language and Literature	F	Bachelor's Degree	Member

Data Collection Tools

Semi- structured interviews were used for data collection as they allow the researcher to test a hypothesis (Fraenkel & Wallen, 2006, p. 455). In the process of forming data collection tools, a question pool which included opinion and values questions regarding the favouritism practices in the literature is formed and then a number of open-ended questions were selected from this pool by consulting the experts of the field. To ensure content validity, 3 lecturers in the field of educational administration were asked to look at the questions and then final interview protocol was produced. In order to understand whether the semi-structured interview protocol was clear enough for the participants, it was tested on two teachers who did not participate in focus group interviews. The interviews with these two teachers showed that the questions were clear and comprehensible.

Data were collected between April and May 2014 in Ankara-Altındağ through face to face interviews. Before the interviews, participants were provided with three different types of favouritism examined within the scope of this study and annotation on these types was distributed to teachers. In addition, to avoid any violation of ethics, “ethics form” was prepared and given to the participants. Ethics form informed about the process and research, assured of confidentiality and ensured that tapes and transcripts would be securely stored and would not be used for any purpose other than this research. This form enabled participants to reflect their real feelings and ideas about the research and thus their dispositions of social desirability were controlled.

During the data collection process, it is noted that some teachers replied question with anxiety due to the nature of topic. Two teachers rejected participating in the study upon being informed on the sort of questions they will be asked in interviews. Interviews were conducted in teachers' room of the schools and lasted between 25 and 30 minutes. It has been paid attention that no other person was in the room except from the participant and researcher during the interview. Only 13 interviews were audio-recorded and other 4 interviews were noted down. Later on, interviews were transcribed and the transcripts were emailed to interviewees for them to check and approve. After participants approved the transcripts, data analysis process started.

Data Analysis

Descriptive analysis was employed. First of all, each interview was transcribed and transferred to interview protocol as it was. The first part of interview protocol includes contextual information such as the school, interview date and time, number of interview and comments regarding the interviews whereas the second part has descriptive data. This descriptive data include the transcript of the interview. Data analysis started with several reading of transcripts. It was followed by extraction of statements that are not related to the topic of

research. Then each interview was coded. In the coding process, two researchers coded separately the descriptive data and marked the related themes. Thus, each theme worked as a boundary of data (Şimşek & Yıldırım, 2013). The coding process was followed by a comparison of the codes to ensure the validity and reliability of the research

Validity and Reliability

Content validity was first ensured by consulting three experts so that the study can produce valid and reliable results. To control participants' social desirability disposition, ethic form was prepared. The factor of "participants' characteristics", which is a threat to internal validity, (Fraenkel & Wallen, 2006, p. 170) was controlled by using maximum diversity sampling. Thus, the possibility of producing biased results that may arise from including participants that share same or similar characteristics has been reduced. Also, factor of location, which is again a threat to internal validity, was addressed through conducting the interviews in teachers' room. All teachers' room in which interviews were conducted shared similar physical characteristics so the factor of location can be argued to have less effect on the results of research. In addition, conducting individual interviews rather than focus group ones prevented possible 'interaction effect' on participants. On the other hand, Campbell and Stanley (1963) argue that 'instrumentation' also pose a threat to internal validity (Trochim & Land, 1982, cited in Stanley, 1963). The threat of instrumentation compromises the analysis of data collected; this data is also laden with the biases of the researcher (Fraenkel & Wallen, 2006, p. 173). In order to prevent instrument decay in the analysis of researchers due to fatigue and long hours of work, data was dealt with frequent and short intervals.

The reliability of research was sought through consensus among researchers who coded the data. Number of 'Consensus' and 'disconsensus' were formed. So if a coding is marked under the same theme, it is noted as 'consensus' but if codes are marked under different themes by researchers, then it is noted as 'disconsensus'. The formula of Miles and Huberman (1994) for research reliability was also used for the study:

Reliability: Consensus/ (Consensus) + (Disconsensus)

If reliability calculations show a value of 70 percent or over, then it means that research has produced reliable results (Miles & Huberman, 1994). In this study, the consensus among the researchers was calculated as 87%, which shows that research is reliable.

FINDINGS

Five themes emerged from data (transcripts). These themes are; 1) existence of favouritism (whether there is favouritism in educational organisations), 2) actors of favouritism (who practices favouritism), 3) types of favouritism (Nepotism, cronyism, favourism), 4) problems caused by favouritism (negative situations caused by favouritism) and 5) the effect favouritism and favouritism practices on teachers' feelings (how they feel about favouritism). Subthemes and frequencies of participants' views are presented in relevant tables.

The first theme emerged from data analysis is 'existence of favouritism'. As seen in Table 2, although 17 participants have different level of sureness regarding the existence of favouritism, they think that favouritism practices exist in any unit or level of education organisations. 12 participants think that favouritism exist, 2 of them firmly stated that favouritism definitely exists and 3 participants' preferred not to reply on the question of whether favouritism exists. Participants' ideas on favouritism provide an understanding of the dominant insight in education institutions.

Table 2: Teachers' ideas regarding the existence favouritism

Codes	frequency
Favouritism definitely exists	2
Yes, favouritism exist	12
Favouritism may exist	3
Total	17

The second theme is 'actor(s) of favouritism'. Frequency level of this theme is presented in table 3. As seen in table 3, participants argued that favouritism mostly practiced by teachers' unions and school managements. Some of the views regarding teachers' unions are as follows:

"Today, there is a union which manipulates all the administrative staff" (T1).

"If you belong to the same union, favouritism exists. Everyone favours the people in their union (...) There is a lot of tension. Like 1980s, now it is not very safe to be a member of a union" (T6).

“(...) Unions gather a certain group of people who share the same ideology. These unions manipulate people and everyone is aware of it.” (S17)

In Turkey, in total 1,007,865 civil servants in education and science services are a member of a union as of 2013 (Official Newspaper, 2014). Unions with the most members are as follows: Eğitim Bir Sen (%24,92), Türk Eğitim Sen (%22,35), Eğitim Sen (%12,34) and Eğitim İş (%3,46). Yılmaz and Altinkurt's research (2011) conducted with 91 teachers argue that political parties which are in power try to interfere the system through unions.

Table 3: Teachers' ideas regarding the actors of favouritism

Codes	frequency
Unions	4
School Management	4
Government	3
Top Management of Ministry of National education	3
District Directorate of National Education	3
School principal	2
Participants who did not present an opinion	3
Total	21

Four participants indicated that favouritism is practiced by school principals and assistant principals whereas two teachers said it emerges from practices of school principal only:

“To be honest, we have practices of favouritism in our school. Assistant principal constantly overlooks some teachers' mistakes. Even if a parent complains about them, he stands for teachers. However, when a parent complains about me, he immediately calls me into his room to have a talk.” (T11)

“Principals sometimes form their own group or network of teachers in schools.” (T10).

“I am not speaking about my current school but in my previous school, the school principal was more tolerant to some teachers and was close friends with them. They were taking the rules together in school boards” (T2).

These statements show that school principal(s) are close to certain group of teachers at schools; they are more tolerant to them; and they display different attitudes for different teacher groups. This finding concurs with the research findings of Meric and Erdem (2013).

Three participants indicated that favouritism arises from top management of Ministry of National Education (MoNE) whereas another three participants believe it is government-led. This finding supports the study of Yılmaz and Altinkurt (2011). In addition, three participants stated that District National Education Directorate plays a role in favouritism. Teachers who think favouritism is MoNE related made the following statements:

“Favouritism exists in every level. It happens both in the centre (meaning MoNE) and at schools. There is no place in which favouritism does not exist.” (T10).

“Favouritism generally exists. In the middle of the night, some schools announce that they need teachers. The teacher who is arranged to go that school applies for the position online and gets the job and since you are sleeping at that time you cannot see the position. If you know someone who can help you, the vacant positions open in the middle of night. They can even perform favouritism in such a centred online system.” (T12).

Thus teachers indicated that favouritism covers and affects the entire system and is practiced frequently. Participants who blamed government for favouritism expressed their feeling as follows:

“The school principal was more tolerant to some teachers and was close friends with them. They were taking the rules together in school boards. We were only two women and we were not saying much. Yet, the current government is responsible for these”(T2).

“It is all being practiced by the government, is not it?(I am being frank because you will delete the recordings after transcription) (S7).

“We all see what is happening in the centre (government). All the conditions/requirements on the system have been removed. Why? Because of government”(S14).

The teachers who believe that favouritism is District Directorate of National Education related made the following statements:

“Branch officers (within District Directorate of National Education) are very influential in favouritism. My friend’s father-in-law was a branch manager in the district of national education and his daughter-in-law was appointed to a central school when she was a first year trainee teacher. I had to work in the same school for 3 years to be appointed to that school because I did not have anyone who would support my application in District Directorate of National Education. Yet, she could work there on her very first year” (S16).

“We (our schools) is connected to District Directorate of National of Education and this institution practice favouritism”(T5).

One of the participants summarized the ideas regarding the favouritism as: *“I can say that school management and District Directorate of National Education practice favouritism. My experiences say so. District Directorate of National Education decides who will be a principal and everyone knows that this is determined on the basis of partisanship. School managements should take the diplomas and certificates of teachers into considerations”(T3).* Thus, he pointed out how system and actors act together in harmony in practicing favouritism.

The third theme is ‘*the most practiced type of favouritism in education system*’. As noted in methods section, participants were informed on three different types of favouritism. Table 4 below presents the data frequency below:

Table 4: The most practiced type of favouritism in education system

Codes	frequency
Political Favouritism (Cronyism)	11
Favouritism of Acquaintances (Favourism)	5
Favouritism of Relatives (Nepotism)	1
Total	17

Most of the participants said that political favouritism (cronyism) is noted as the most common favouritism. Their statements pointed out that political favouritism is more evident and felt more in relation to other types of favouritism. Below there are some striking quotations from interviews:

“I can say that, there is a union which manipulates management staff. Anyway, there is a political unity in this union. Therefore, based on the definition you gave, I can clearly say that cronyism is more common than the others.” (S1)

“I would say cronyism (is the most common). In early years of my profession, favouritism of relatives or friends were quite a lot. These days, I think political favouritism is practiced more. This happens both at local and central (MoNE) level. Current situation shows that political ideas are common in these favouritism practices.” (T5).

“There is mostly political favouritism. The school principals are a member of the same union for so many years. I have never seen an assistant principal who is a member of Eğitim-İş or Türk-Eğitim Sen. I don’t think it is a coincidence. It is obvious that there is a political favouritism” (T6).

“There is a political favouritism and from time to time, it is possible to witness relative or friend favouritism. If you ask me which one is common, I would say the political one. But if you ask other people (my friends), they won’t accept it. The ones who deserve do not get any promotion. They should promote the ones who work hard, should not they? I have lived in Europe for 2 years. It does not work like that there. No one cares about your political ideas, they take your skills into consideration.” (T7).

“I don’t know which one to say; relative-friend favouritism or political one? I can say that favouritism of friends or relatives is very much related to political favouritism because they know some people who are engaged in high politics such as branch manager or someone from district of national education. Everything is being handled somehow. If you have someone who supports you, every problem can be solved very easily. Of course, I can argue that in small cities these kind of things are handled much more easily. In Ankara, it is more difficult.” (T12).

“Well, political favouritism is more common as in every arena of society. The way things work are also reflected us. But this is not something happening lately. There have always been political favouritism. It is not a recent issue.” (T16).

Participants noted that the second common favouritism is favourism (favouritism of friends or acquaintances). One participant who thinks favouritism of friends is the most common said: *“I have worked in a couple of schools, so far. I have not witnessed anything in my current school, yet. But, in the previous school I worked, school principal was close to a number of teachers. Since they were close friends, I could say that favouritism of friends are common.” (T2).* Similarly, another participant confirmed T2’s idea and said:

“Favouritism of the people you know is the most common. If you find someone to support you, you can work in a more central school or you can have 2 or 3 hours of teaching in a week even if you are an extra teacher in the school. There are teachers who get paid without going to school. What else do you expect?” (T17).

The least common favouritism mentioned by teachers is favouritism of relatives (nepotism). Only one participant touched upon nepotism and said: *“They hire their relatives or friends as part time teachers. In one of my schools, the elder brother was school principal and the younger brother was assistant principal.” (T10).* On the basis findings, it could be argued that political ideas matter more than the employee’s qualifications or the requirements of a particular position in education system. This is followed by the personal relationships such as friendship and then kinship in promotions or access to opportunities.

The fourth theme, which is thought be caused by favouritism practices, is *“problems within and outside the school.”* Views regarding this theme are presented in Table 5. Participants mostly expressed that favouritism hindered education facilities ($f=3$). Two of the teachers made the following statements:

“I could say that when we have an extra teacher of a particular field and there may be a need for that particular field teaching staff in another school. Yet, that extra teacher is not being sent there not to make her uncomfortable. We experience this a lot in this 4+4+4 system. In one school, the teacher does not have any classes whereas in another school, they need that teacher to do classes.” (T4)

“Sometimes students fell behind in courses because some teachers constantly receive medical reports and do not come to school. It is school management’s responsibility to control this.” (T7).

These statements show that managers placed students into a disadvantaged position for the sake of protecting teacher. Another teacher also talked about how a branch manager in District Directorate of National Education appointed his wife, who was a trainee teacher, to a central school in the middle of term and left students in that school without teacher:

“I mentioned you about that friend. When she left all of a sudden to work in a central school, even the principal got shocked and immediately asked for a part-time teacher. Yet, it takes time for part-time teachers to be employed. It was pity for those children. Their teachers left all of a sudden so we covered these students’ classes. They were first grade primary school students and waited quite long for a teacher. It is always like that. Someone makes a mistake and the ones who are left behind pay the price.” (T16).

Table 5: Teachers’ ideas regarding the problems caused by favouritism

Codes	frequency
Hindering education facilities	3
Lack of communication between parent and teacher	2
Not getting sufficiently prepared for ceremonies	1
Taking wrong decisions about students	1
Insufficient cleaning of school and classes	1
Not sending teachers in need of in-service education to trainings	1
Unequal distribution of equipment and classes	1
Inexperienced managers	1
Not meeting the obligations of a job or a task	1
Total	12

In this respect, favouritism practice hinder education (teaching) practices and cleaning facilities. This affects students since wrong decisions are being taken and it also influences teachers in a negative way as there is not

sufficient inspection and teachers who need in-service training are not chosen for training. Mostly, it affects the managerial duties and practices given that unqualified and inexperienced people are being appointed to managerial positions in which these people cannot always serve meticulously. It could be argued that favouritism has a negative impact on every person in the education system.

The last theme in the study is “*effect of favouritism practices on teachers’ feelings*”. Table 6 presents frequency level of this theme.

Table 6: Teachers’ ideas regarding effect of favouritism practices on their feelings

Codes	frequency
Injustice, inequality	6
Anger/Rage	5
Sadness	2
Loss of trust toward manager	1
Decrease in motivation	1
Jealousness	1
Desensitization (normalization of favouritism)	1
Total	17

Participants mentioned that when they witnessed or suffered from favouritism, their sense of justice was damaged or they thought that they were not being treated equally. This finding negatively affects organisational justice (Karacaoğlu & Yörük, 2012; Laker & Williams, 2003; Mearawi, 2010; Polat, 2012; Polat & Kazak, 2014; Spranger, Colarelli, Dimotakis, Jacob & Arvey, 2012; Uğurlu & Üstüner, 2011) and perception justice among employees (Ateş, Sözen & Yeloğlu, 2014). Thus, this finding concurs with those discovered by above mentioned research.

Some of the participants said they felt rage/anger and sadness. Also, one of the participants stated that the trust toward manager was damaged. This finding supports those found by other research (Keleş, Özkan & Bezirci, 2011; Mearawi, 2010). Favouritism can be argued to decrease the motivation, push people to dig a pit for each other and cause feelings such as jealousy. These findings confirm the research results of Hernandez and Page (2006) and Okyere-Kwakye, Nor and Nor (2010). When asked how favouritism makes them feel, one of the teachers said: “*You get used to this situation. In my early career years, I used to think that this was not fair. Now, I got accustomed to it. In Turkey, you get used to these things.*” This statement is rather important as it can be read as *normalization of favouritism* and developing desperation in fighting against it whereas the other feelings about favouritism imply that teachers do not approve it and see it something to be challenged and deconstructed.

CONCLUSION, DISCUSSION and SUGGESTIONS

The favouritism behaviour and its consequences affect mostly educational institutions as well as other organisations. Education institutions are different from other organisations as they are supposed to promote equity and justice and the equal treatment of students. In this respect, people or groups which work in these institutions and also the institution itself should “set an example for students”. Yet studies show that there are instances and practices of favouritism in central institutions, provincial organisations and at schools and that teachers believe that managers discriminate on the basis of political beliefs and do not treat everyone fairly (Aydoğan, 2009; Ekinci, 2010). The fact that teachers’ strong desire fair and impartial practices in the education system cannot be met has caused a number of negative consequences mentioned in the literature (Araslı, Bavik, & Ekiz, 2006; Araslı & Tümer, 2008; Keleş, Özkan & Bezirci, 2011; Büte, 2011b).

The first finding of the research is that participants confirmed favouritism exists in educational institutions. Two studies on favouritism (Meriç & Erdem, 2013; Polat & Kazak, 2014) showed that school managers rarely showed favouritism. Yet, in this research 14 participants out of 17 clearly stated that favouritism practices are evident in the system and exemplified these practices.

The second finding of the research is that there are many actors of favouritism in educational institutions. Participants pointed out not only school managers but also teachers’ unions, governments, top management of MoNE and managers in District Directorate of National Education also practice favouritism. They argued that these kinds of behaviours exist and are prevalent at every level of education institutions. One of the participants said: “*I can say that school management and district directorate of national education practice favouritism. My experiences say so. District of National Education decides who will be a principal and everyone knows that this*

is determined on the basis of partisanship. School managements care about teachers' unions. Teachers' unions are quite influential on these issues." (T3). Thus, he drew attention to how a person, a group or a unit are indeed related to one another. One of the most important problem of education system is that political parties in power are constantly interfering to the system with political reasons. This may cause to question the qualifications of people who are assigned to higher ranks by the support of a political power. It may also lead these people to be seen untrustworthy (Yılmaz & Altınkurt, 2011). This outcome creates a perception that appointment of teachers and managers are not done on the basis of skills and qualifications but rather according to their political ideas and their closeness to the parties in power. Aslanargun's research (2012) held with 19 principals showed that principals suggested in the process of school manager appointments respectively the criteria of exam, career, qualification and leadership skills should be taken into consideration. What is hopeful is that there are principals who suggest such objective criteria. In order to promote this objective thinking, employment of all educational employees should be clear enough to be understood by everyone; the principle of impartiality should be promoted; and objective assessment should be carried out in performance evaluation. Thus, there will be little space for practices of favouritism.

The third finding is that all three types of favouritism was mentioned as the most frequent favouritism by different teachers. This finding strengthens the judgement that every sort of favouritism can be seen in education organisations. Participants argued that cronyism is the most frequently experienced favouritism in education organisations and this has negative effects both for individuals and the organisation. The research show that politics oriented favouritism decreases self-efficacy and performance of employees (Erdem, 2010; Khatri&Tsang, 2003), and increases jobs stress (Araslı&Tümer, 2008) and turnover intention (Karataş, 2013). It is also found that cronyism decreases job satisfaction (Araslı&Tümer, 2008; Erdem, 2010; Karataş, 2013), affects organisational commitment negatively (Khatri & Tsang, 2003) and damages organizational trust (Polat, 2013). Considering that organisational relationships and successes are based on mutual trust, commitment and shared interests and values (Berman, West & Richter, 2002), it is obvious that any external interference to education system can damage the way organisation operate. Therefore, to prevent cronyism, transparency and accountability should be introduced for the entire system including social system. Another suggestion on this issue could be to strengthen the knowledge of employees in education sector on "educational law and legislation".

The fourth findings is that favouritism can lead to various problems. Teachers' views regarding the problems caused by favouritism were limited with school mechanism. Teachers argued that favoured teachers' neglect of duty was ignored; students were victimised to protect favoured teachers; appointment of teachers were not conducted by the rules; and favoured teachers were privileged in in-service training courses which grants daily wage to teachers. These findings indicate that benefits that could be brought by standardized and well-structured operation processes and meticulous applications of these processes are ignored. Standardized operation procedures of schools can guide operation of organisation; provide the necessary information to employees on how to carry out their tasks properly; create consistency, harmony and continuity within the organisation; monitor policies of organisation; and decrease the practices of favouritism.

The last finding is that teachers have different feelings about favouritism. It could be seen that favouritism mostly arouses the feeling of injustice, inequality, rage and sadness in teachers and also damage their trust toward school principal. This findings concurs with several research results (Ateş, Sözen & Yeloğlu, 2014; Karacaoğlu & Yörük, 2012; Keleş, Özkan & Bezirci, 2011; Laker & Williams, 2003; Mearawi, 2010; Polat, 2012; Polat & Kazak, 2014; Spranger, Colarelli, Dimotakis, Jacob & Arvey, 2012; Uğurlu & Üstüner, 2011). Basu (2009) argues that injustice is best concept that defines and characterises favouritism. Injustice causes employees to strive less and to feel insufficient for not being properly subjected to performance assessment criteria. It also leads employees to lose their motivation because their needs of self-actualization, success or feeling of self-worth are not met. Lastly, injustice creates loss of commitment if there is a lack of unity in organisation or opportunities of collaboration.

In order to prevent current and possible favouritism practices, transparency and impartiality principles should be adopted for recruitment and promotion of teachers and school managers. The people who are responsible of management of the system should have an equal stance to everyone and national promotion criteria should be restructured in a way that no one is favoured. It is hoped that the research findings can be beneficial and guiding for managers to re-design of aforementioned practices and policies. Also, it is believed that the study can shed light on planning of policy improvements based on transparency and accountability.

References

- Abdalla, H. F., Maghrabi, A. S., & Raggad, B. G. (1998). Assessing the perceptions of human resource managers toward nepotism. *International Journal of Manpower*, 19 (8), 554-570.
- Araslı, H., Bavik, A., & Ekiz, E. H. (2006). The effects of nepotism on human resource management: The case of three, four and five star hotels in Northern Cyprus. *The International Journal of Sociology and Social Policy*, 26, 295-308.
- Araslı, H., & Tümer, M. (2008). Nepotism, favoritism and cronyism: A study of their effects on job stress and job satisfaction in the banking industry of Northern Cyprus. *The International Journal of Sociology and Social Policy*, 36, 1237-1250.
- Aslanargun, E. (2012). Okul müdürlerinin sahip olması gereken değerler. *Kuram ve Uygulamada Eğitim Bilimleri*, 12(2), 1327-1344.
- Asunakutlu, T., & Avcı, U. (2010). Aile işletmelerinde nepotizm algısı ve iş tatmini ilişkisi üzerine bir araştırma. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 15(2), 93-109.
- Ateş, M. F., Sözen, H. C., & Yeloğlu, H. O. (2014). Çalışanların eşitsizliğe yönelik algı ve tepkileri: Mavi ve beyaz yakalı çalışanların üzerine bir araştırma. *Journal of Business Research Turk*, 6(2), 106-124.
- Aydoğan, İ. (2009). Favoritism in Turkish Educational System: Nepotism, cronyism and patronage. *Educational Policy Analysis and Strategic Research*, 4(1), 19-35.
- Bassman, E. & London, M. (1993). Abusive managerial behaviour. *Leadership & Organization Development Journal*, 14(2), 18-24.
- Basu, S. (2009). *Workplace nepotism and stress*. Retrieved from <http://ssrn.com/abstract=140908> on 8th of July, 2014.
- Begley, T. M., Khatri, N., & Tsang, E. W. (2009). Networks and cronyism: A social exchange analysis. *Asia Pacific Journal of Management*, 27, 281-297.
- Bellow, A. (2004). *In praise of nepotism: A history of family enterprise from King David to George W. Bush*. New York, NY: Anchor Books.
- Berman, E. M., West, J. P. & Richter, M. N. (2002). Workplace Relations: Friendship patterns and Consequences. *Public Administration Review*, 62(2), 217-230.
- Büte, M. (2011a). Nepotizm ve iş tatmini ilişkisinde iş stresinin aracı rolü var mıdır?. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, 29, 175-184.
- Büte, M. (2011b). Kayırmacılığın çalışanlar üzerine etkileri ile insan kaynakları uygulamaları ilişkisi: Türk kamu bankalarına yönelik bir araştırma. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 15(1), 383-404.
- Chandler, J. L. (2012). *Black women's perceptions of the relationship among nepotism, cronyism, job satisfaction, and job-focused self efficacy* (Unpublished Doctoral Thesis). The University of San Francisco, California.
- Ciulla, J. (2007). Ethics and effectiveness: The fabric of leadership. *The GovNet e-Journal*, 71-81.
- Coil, J. H., & Rice, C. M. (1995). What's love got to do with it? Employer rules regarding off-duty relationships. *Employment Relations Today*, 22(1), 79-89.
- Creswell, J. W., & Clark, V. L. P. (2007). *Designing and conducting mixed methods research*. Thousand Oaks: Sage Publishing.
- Davoli, L. B. (2008). Favoritism in the workplace. *KMPH Fox 26 News*. Retrieved from <http://www.kmph.com/Global/story.asp?S=8129498> (Accessed April 7th, 2008).
- Dökümbilek, F. (2010). Aile şirketlerinde nepotizm ve bir uygulama (Yayımlanmamış yüksek lisans tezi). Bahçeşehir Üniversitesi, İstanbul.
- Düz, S. (2012). Konaklama işletmelerinde nepotizm ile örgütsel bağlılık arasındaki ilişkinin incelenmesi (Yayımlanmamış yüksek lisans tezi). Afyon Kocatepe Üniversitesi, Afyon.
- Dyer, W. G. Jr. (2006). Examining the "family effect" on firm performance. *Family Business Review*, 19, 253-273.
- Ekinci, A. (2010). Opinions of principals and teachers working in primary schools about their vocational problems. *Elementary Education Online*, 9(2), 734-748: <http://ilkogretim-online.org.tr>.
- Elbo, R. A. H. (1998). *In the workplace: Nepotism by CEOs*. *Business World*, 1. Retrieved from ABI/INFORM Trade and Industry.
- Erdem, A. R. (2010). İlköğretim ve ortaöğretim öğretmenlerinin karşılaştığı özlük sorunları ve bu özlük sorunlarının performanslarına etkisi konusundaki görüşleri. *Adnan Menderes Üniversitesi Eğitim Fakültesi Eğitim Bilimleri Dergisi*, 1(1), 21-55.
- Finelli, G. M. (2011). From the dinner table to the boardroom: The effects of nepotism on family businesses (Unpublished Doctoral Thesis). The American University, Washington DC.
- Ford, R., & McLaughlin, F. (1986). Nepotism: Boon or bane? *Personnel Administrator*, 31(5), 78-89.
- Fraenkel, J. R., & Wallen, N. E. (2006). *How to design and evaluate research in education* (6th ed.). New York: McGraw-Hill Higher Education Publishing.

- Gorodnichenko, Y., & Roland, G. (2012). Understanding the individualism-collectivism cleavage and its effects: Lessons from cultural psychology. In *Institutions and comparative economic development* (pp. 213-236). Basingstoke, Hampshire: Palgrave Macmillan.
- Hayajneh, A. F., Maghrabi, A. S., & Al-Dabbagh, T. H. (1994). Assessing the effect of nepotism on human resource managers. *International Journal of Manpower*, 15(1), 60-67.
- Hernandez, E. H., & Page, R. A. (2006). Nepotism in the employment recruitment process: How nepotism builds organizational commitment. *Journal of Business Management and Change*, 1(1), 3-13.
- Hofstede, G., & Hofstede, G. J. (2005). *Cultures and organizations: Software of the mind* (2nd. ed.). New York: McGraw-Hill.
- İyişleroğlu, S. C. (2006). Aile şirketleri: Adana ve çevresinde faaliyet gösteren aile şirketlerinde nepotizm uygulamasının tespitine yönelik bir araştırma (Yayımlanmamış yüksek lisans tezi). Çukurova Üniversitesi, Adana.
- Karacaoğlu, K., & Yörük, D. (2012). Çalışanların nepotizm ve örgütsel adalet algılamaları: Orta Anadolu Bölgesi'nde bir aile işletmesi uygulaması. *İş, Güç' Endüstri İlişkileri ve İnsan Kaynakları Dergisi*, 14(3), 43-64.
- Karataş, A. (2013). Otel işletmelerinde kronizmin iş tatmini ve işten ayrılma niyeti üzerindeki etkileri: Muğla ilinde bir araştırma (Yayımlanmamış yüksek lisans tezi). Balıkesir Üniversitesi, Balıkesir.
- Keleş, N. H., Özkan, K. T., & Bezirci, M. (2011). A study on the effects of nepotism, favoritism and cronyism on organizational trust in the auditing process in family businesses in Turkey. *International Business and Economics Research Journal*, 10(9), 9-16.
- Keller, M. (t.y.). *Leadership and the "Good Old Boys."* Retrieved from <http://www.kellerconsultants.com/PSgood.htm>
- Kets de Vries, M. F. R. (1993). *Leaders, Fools, and Impostors*. San Francisco: Jossey-Bass Publishers.
- Khatiri, N., & Tsang, E. W. K. (2003). Antecedents and consequences of cronyism in organizations. *Journal of Business Ethics*, 43, 289-303.
- Laker, D. R., & Williams, M. L. (2003). Nepotism's effect on employee satisfaction and organisational commitment: An empirical study. *International Journal of Human Resources and Management*, 3(3), 191-202.
- Loewe, M., Blume, J., & Speer, J. (2008). How favoritism affects the business climate: Empirical evidence from Jordan. *Middle East Journal*, 62, 259-276.
- Mahamatjan Kyzy, D. (2011). *The effects of perceived nepotism and job stress on organizational citizenship behavior: An empirical study in Kyrgyz family-managed company* (Yayımlanmamış yüksek lisans tezi). Marmara Üniversitesi, İstanbul.
- Mearawi, R. R. (2010). *Employees' perceptions of justice in the family firm* (Yayımlanmamış yüksek lisans tezi). American University of Beirut, Suliman S. Olayan School of Business: Beirut.
- Meriç, E., & Erdem, M. (2013). İlköğretim okullarında görev yapan öğretmenlerin algılarına göre okul yönetiminde kayırmacılık. *Kuram ve Uygulamada Eğitim Yönetimi Dergisi*, 19(3), 467-498.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco: Jossey-Bass Publishers.
- Miles, M., & Huberman, M. (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks, CA.: Sage Publications.
- Morrissey, H. (2006). How to nip nepotism in the bud: Nepotism should never be a problem or consideration at a growing, thriving franchise company. *Franchising World*, 38(10), 161-174.
- Nelton, S. (1998). The bright side of nepotism. *Nations Business*, 86(1), 1-5.
- Okyere-Kwakye, E., Nor, K., & Nor, N. G. (2010). Nepotism and tribalism in teams: An initial investigation. *African Journal of Business Management*, 4(16), 3508-3512.
- Padgett, M. Y., & Morris, K. A. (2005). Keeping it, "all in the family." Does nepotism in the hiring process really benefit the beneficiary? *Journal of Leadership and Organizational Studies*, 11(2), 34-45.
- Podgers, J. (1996). Marriage traps in the workplace. *ABA Journal*, 82, 46. Retrieved from <http://0-web.ebscohost.com.ignacio.usfca.edu/ehost/pdfviewer/pdfviewer?vid=2&hid=104&sid=6787657b-3f23-4910-8111-8f3fab27b2b5%40sessionmgr113>
- Polat, G. (2012). Örgütlerde nepotizmin örgütsel adalet algısı ile ilişkisinin tespitine yönelik bir araştırma (Unpublished Master Thesis). Dumlupınar Üniversitesi: Kütahya.
- Polat, S., & Kazak, E. (2014). Okul yöneticilerinin kayırmacı tutum ve davranışları ile öğretmenlerin örgütsel adalet algıları arasındaki ilişki. *Kuram ve Uygulamada Eğitim Yönetimi Dergisi*, 20(1), 71-92.
- Polat, R. (2013). Ortaöğretim kurumlarında kronizm algısının örgütsel güven üzerindeki etkisi (Yayımlanmamış yüksek lisans tezi). Fırat Üniversitesi, Elazığ.
- Rabin-Margalioth, S. (2006). Love at work. *Duke Journal of Gender and Law Policy*, 13, 237-253. Retrieved from <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1105&context=djglp>
- Reed, C. M., & Cohen, L. J. (1989). Anti-nepotism rules: The legal rights of married co-workers. *Public Personnel Management*, 18(1).

- Reich, S. M., & Reich, J. A. (2006). Cultural competence in interdisciplinary collaborations: A method for respecting diversity in research partnerships. *American Journal of Psychology*, 38, 51–62.
- Sadozai, A. M., Zaman, H. M. F., Marri, M. Y. K., & Ramay, M. I. (2012). Impact of favoritism, nepotism and cronyism on job satisfaction: A study from public sector of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 4(6), 760-771.
- Spranger, J. L., Colarelli, S. M., Dimotakis, N., Jacob, A. C., & Arvey, R. D. (2012). Effects of kin density within family-owned businesses. *Organizational Behavior and Human Decision Processes*, 119, 151-162.
- Sullivan, K. R., & Mahalik, J. R. (2000). Increasing career self-efficacy for women: Evaluating a group intervention. *Journal of Counseling and Development*, 78, 54–62.
- Sünneli Erden, P. (2014). The relationship between paternalistic leadership, perceived employment discrimination and nepotism (Unpublished Master's Thesis). Yeditepe University, İstanbul.
- Şimşek, H., & Yıldırım, A. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Yayıncılık.
- Şişman, M., & Arı, A. (2009). Kırgızistan'da eğitimin temel problemleri ve öğretmenlerin hizmetiçi eğitim ihtiyacı. *Sosyal Bilimler Dergisi*, 21, 133-147.
- Trochim, W., & Land, D. (1982). Designing designs for research. *The Researcher*, (1)1, 1-6.
- Uğurlu, C. T., & Üstüner, M. (2011). Öğretmenlerin örgütsel bağlılık düzeylerine yöneticilerinin etik liderlik ve örgütsel adalet davranışlarının etkisi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 41, 434-448.
- Van der Heyden, L., Blondel, C., & Carlock, R. S. (2005). Fair process: Striving for justice in family business. *Family Business Review*, 18 (1).
- White, R. D. (2000). Consanguinity by degrees: Inconsistent efforts to restrict nepotism in state government. *State and Local Government Review*, 22, 108–120.
- Wong, L. C., & Kleiner, B. H. (1994). Nepotism. *Work Study*, 43(5), 10- 12.
- Yıldırım, M. C. (2008). İlköğretim okulu öğretmen ve yöneticilerinin öğretmenlerin ödüllendirilmesine ilişkin görüşleri. *Kuram ve Uygulamada Eğitim Yönetimi*, 56, 663-690.
- Yılmaz, K., & Altınkurt, Y. (2011). Öğretmen adaylarının Türk eğitim sisteminin sorunlarına ilişkin görüşleri. *Uluslararası İnsan Bilimleri Dergisi*, 8(1), 942-973.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: Sage.

Technical Education Of Preschool And Schoolchildren

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ABSTRACT

A project "Technical kindergarten" was prepared and realized in years 2013 – 2015 to support the interest in technology. The aim of the project was to rouse the interest in the children between the age 6 and 11, as well as support the overall technical and scientific literacy. It was supposed to improve their ability to understand new basic technical knowledge while understanding its practical influence on everyday life. The implementation of technical information into the teaching and creation of individual assignments were ensured by a diverse team of schoolteachers and specialists working in technical praxis. In the project, there were involved a university, primary school, two technical companies and Czech Management Association (an association of top managers of prominent companies in Czech Republic). This paper describes the project as well as pedagogic and psychological aspects of such education and, of course, the experience gained during the introduction of the exercises into the teaching.

INTRODUCTION

In the last years, the number of university graduates is increasing very fast, but the increase involves mostly humane and economic disciplines. Technical and natural branches of study rather stagnate decreasing their representation in the whole level of education. It is clear that mathematics, physics or chemistry interest fewer students than is desired and needed. As a result, Czech Republic contends with a lack of technically educated young people. However, this issue applies to the whole EU as well.

To improve this situation, an intention turned up to start the technical education of children as soon as possible. Since 2010, an experiment took place that was focused on the development of knowledge and dexterities (such as motor activity, thinking, communication, cooperation) of preschool children. Children made mostly bridges out of wood and paper. Several walks were made around the city Brno to increase the interest. The targets of these walks were bridges around the city with different structural systems. Thus, the teachers in the kindergarten had to learn some new technical information from this field of knowledge. The academic stuff of Brno University of Technology participated in this in the form of workshops for the teachers. Of course, the groundwork was adjusted as to fit the needs of teaching small children. The whole project was then awarded in a national competition INNOVATION 2011 organized by the Technology Agency of the Czech Republic.

These activities expanded in the year 2012 to the primary school. By working on simple experiments, it is easy to improve the ability of the children to use small tools as well as to introduce them into natural and technical laws. Since 2013, the preparation of methodical manuals (Havelkova, 2015) began for such schooling. The teachers of selected primary school and academic stuff of BUT created a lot of subjects in the following areas: occupational safety, houses and bridges, means of transport, music, trees, historical buildings, mathematics and experiments.

Trial schooling of these methods started in May 2014 and it covered children of age 6 to 11 years old (first to fifth grade). The schooling started in the primary school whose teachers were involved in the preparation of the manuals. Also, some of the children were already included in the experimental teaching mentioned above i.e. they had almost five years of experience with technical education (especially these children showed significant improvement in dexterity). The trial teaching was carried out in several other schools to verify the teaching method in an environment without any experiences with technical education. The teaching was not restricted by the exact quantity of teaching lessons – it depended on interest and skill of children, equipment of the workshop and personal attitude of teachers and parents.

CONCEPT OF THE PROJECT

The main goal of the project was to boost the motivation of the students in a way to inspire them to build some working model, design new model and try new activities in form of a game while discussing problems with other students. The concept of the project merges standard steps used in creative and innovative processes: idea – design (drawing) – production – presentation.

Student's own creation (design, drawing) as a teaching method begins to be an irreplaceable method in school educational programs. It is necessary to involve as many senses as possible while adopting new knowledge together with understanding related basic principles. The principle is to switch from traditional schooling (based predominantly on memorizing) to methods oriented towards confidence in student's own capabilities. Such principle has two pillars:

- interactive teaching materials,
- actual working as a teaching method.

Students make a functional model of the technical object they are learning about. This model is based on their own ideas and design, however they are led by their tutors. This way enables better fixation of gained knowledge. The following game with those models allows better understanding of functioning as well as technical capabilities of given technical device. Also the game is a collective activity of a group of student, forcing them to converse with each other and thus learning new technical terms. It is best if this activity is completed with excursion.

The change in teaching lies in widening the role of the teachers; they do not work as a mere carrier of knowledge. Teachers perceive themselves as intermediaries of cognition, educators, mentors and partners of the students at the same time.

BASIC SCHEME OF THE LESSON

Every lesson in the project Technical Kindergarten should follow given pattern:

1. Familiarization with the task

Students are told what purpose the given technical object serves for, what is its practical significance and value. Also, the background is explained, such as how it is made, who does the design and who produces it. This is done using explanation, pictures, working models, field trips and excursions (Fig. 1). It is important to maintain correct technical terminology during the whole phase because the students are meant to learn it.



Figure 1: Familiarization with the task and theoretical background of the problem

2. Formation of own idea

Students draw the object according to their own imaginations and ideas (Fig. 2). This drawing serves as a basis for building a model of the object. It is necessary for the teachers to interfere and correct if need be to maintain basic technical solution.

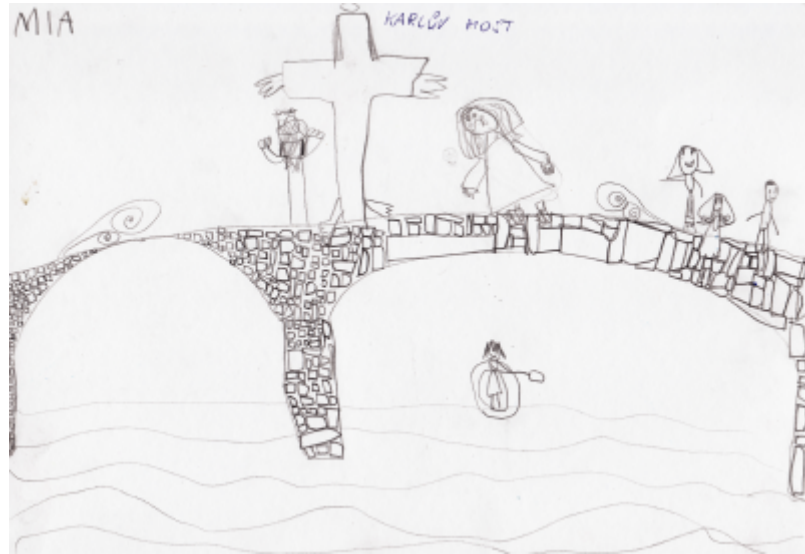


Figure 2: Technical drawing of a bridge

3. Production of the model

A model is created based on the design from the previous phase. Alternatively it is possible to use a ready-made model provided by the teacher. The models should be made of material suggested in manuals, but it is possible to experiment with other materials. The students have to be familiarized with correct manipulation with tools and aids as well as with occupational safety in the workshop. This part of the lessons is the most demanding for both students and teachers.

4. Functionality of the model

The finished model is understood as a play toy simulating real technical object. It is put to the test to verify its functionality (Fig. 3). It should fulfill basic technical demands. If it does not it has to be corrected, supplemented or altered – often, this is a desired output as well.



Figure 3: Working model of the bridge during the loading test

5. Discussion

Students comment their own handmade model in groups. They try to express the technical solution of the problem. There are several important points (questions) they should be able to express:

- Why?
- How?
- Why was this particular solution chosen?
- What purposes is it meant for?

It is expedient to write down the ideas and reactions of students on the flipchart. Also, students can present their notions not only in their class groups but in their families and at children parties as well.

6. Assessment of the lesson

The teacher completes the final assessment of the lesson based on the group discussion (Fig. 4). It is possible and desirable to motivate students into further interest by positive approach and acknowledgment of student's effort.



Figure 4: Final assessment of the lesson done in an assembled group of students

BASIC METHODOLOGICAL RULES OF TEACHING

The rules are based on a presumption that the teaching is strongly influenced by the social climate of the class. This climate results from collective activities and social communication under the influence of social relationships (student, reaction of the group of students, different intelligence type, teachers personality and his teaching technique). The climate influences following:

- cognitive results,
- manifestation of affective behavior.

This is the reason communication plays a significant role during the lessons. There are several methodic rules for the teacher's work that reflect the mutual interaction between teacher and student.

1. Assignment of univocal instructions

Students have to know exactly what to do, why to do and by what means.

2. Opening of the class

Emphasis is put on the initiation of the class. It should be started with clear noticeable signs to catch student's attention immediately.

3. Keeping attention and activity of the students

Cooperation of pupils can be increased by linking the theme of the class with their experiences, for example. It is recommended to switch between different work forms.

4. Tempo and progress of the class

It is necessary to think about the pace of the teaching – it has to correspond with the abilities of all students. Also, the switching to other activities has to be transparent. It is advisable to provide other activities for the quicker student while the slower ones are finishing their tasks.

5. Individual creation

The students should be checked while fulfilling the task and they should be acknowledged for good work. The teacher has to offer support when students lack the ability to complete the task but have the will to do it.

6. Summary of the class

Teacher leads the students in the discussion to assess and summary the knowledge gained during the lesson. This increases the probability of remembering the schoolwork.

7. Utilization of feedback

The criteria used in assessing the students have to be explained to children. Those criteria should be set as to offer the best chances for students to succeed. Even the less successful students should be acknowledged. As a

feedback, the students are asked to express what they liked most.

8. Continuous switching between different themes

It is possible to use the manual step by step. During the lessons it is necessary to notice students asking for help – teacher's response should be calm and quiet and focused on the concerned student alone. Quicker and skillful student can fulfill an additional task on the other hand.

9. Dealing with minor disorders

Students have to be watched carefully for the teacher to be able to detect and avoid disorders and problems. Appropriate intervention in time is essential.

10. Safety of schoolchildren

To provide a safe environment for the workshop classes, it is necessary to keep all rules that were explained to the students beforehand. They have to be familiarized with the equipment of the workshop, working with the tool and with keeping of the order on the table.

EVALUATION FROM A PEDAGOGICAL AND PSYCHOLOGICAL STANDPOINT

The project is undoubtedly a great contribution to the students, teachers and society. It expands the interest in technical activities. The project brings the technical and natural branches of study closer to the schoolchildren using methods appropriate for their age – this is especially important in time of quick technical progress. Students learn to help and advise each other, listen to instructions, counsels and directions of the teacher. The teacher contributes to the development of children's interest in the activities involving an active approach to given tasks that lead to fulfillment of the ultimate teaching goals. Besides increased interest in technical activities, the socialization of the students develops by adopting specifically human forms of behavior and by integrating them into a group and society. An important part is the area of communication development (introduction to technical vocabulary).

During the assessment of the class the teacher emphasizes student's reciprocal cooperation, help and contribution to the task. This contributes to exhibit sociability and friendship. It directs the students to look for a solution and not dwell on the problem to finish the given activity. Gained knowledge are gradually transformed into skills. The teacher can recognize if the student does not hesitate to ask for help (either from the teacher or another pupil).

The preparation of groundwork for the project was based on an approach emphasizing interaction between student and teacher. It used latest finding from the area "communication teacher-student", available social teaching theories (Dinkmeyer, 1996 and Cangelosi, 1996) and "Step by step" methodology (Novotna, 2008). Stimuli and evaluation of the program were prepared in a way to provide psychological conclusions comprehensible not only for academia but for other interested parties as well.

There were several questions influencing the preparation of the project and the final manuals:

- How does it develop the knowledge of the basis of technical and natural sciences?
- What news do the students become aware of during the project?
- What are the activities that influence students the most?
- What is the influence of the project on the future professional career and development of talent of the student?

Results of cognitive abilities of the students were gathered during the year 2014 in a group of primary school children. The testing method was performed according the timeline "pretest" – trial schooling using prepared manuals – "posttest". The criteria were chosen to be as follows:

- analytic-synthetic abilities, logical thinking,
- visual-motor abilities,
- motor and sensory perception, visual memory,
- manual dexterity,
- practical thinking.

The testing battery (Havelkova, 2015) was compiled in a way to allow exact measurement of performance of the students in the testing group. Testing methods were chosen according the stated requirement:

1. Wechsler's scale of general intellect – non-verbal part with the tests:

- dice (motor and sensory perception, analytic-synthetic abilities, logical thinking and understanding of context, manual dexterity),
- jigsaws (visual- motor coordination, manual dexterity, visual perception, practical thinking) and

- coding (visual- motor coordination, attention).

2. Ray-Osterrieth's figure test (motor and sensory perception, attention, visual memory, the level of perception and remembering details including spatial relations).

Additional tests were used to survey visual- motor level:

- TST test (shape assemble test) performed in the groups,
- Bender-Gestalt tracing test performed in the groups and
- orientation laterality test

Non-cognitive factors were equally important part of the success. However they were difficult to measure. Young children are not matured and are highly dependent on evaluation provided by authorities. Positive motivation, persistence, systematic training, support of the family are the most important factors.

The lapse of time between testing of random test groups was six months, to avoid the influence of simple drilling of the tasks. The first testing took place during spring 2014 (before experimental teaching); second testing round took place during autumn 2014. There were 24 students in the testing group, 12 girls and 12 boys. All of them were born between 2003 and 2005 i.e. age 8 to 11. It has to be noted that the initial group was fairly small. Therefore the following results should be taken as an approximate indicator of the development.

There were five left-handers in the testing group, but no direct influence was noted concerning cognitive performance. One student was disabled (health problem), three students were diagnosed with specific learning disorders (light dysgraphia and dysorthography). Fairly small number of students with specific learning disorders does not allow to generalize the influence of these disorders on the performance of the pupils. However, it is obvious, these congenital insufficiencies in visual- motor coordination limited the capabilities of such student to handle some graphomotor tasks very well. The students suffering from dyslexia can run into difficulties with reading of the manuals – it is recommended to appoint another student or teacher to read the instructions.

Comparison of results observed through Wechsler's scale shows significant improvement of cognitive abilities (see Table 1). Tracing test (Ray-Osterrieth's figure) showed considerable constancy both in qualitative as well as quantitative results of individual students. This test determines level and quality of orientation in a complex scheme. Eight students (i.e. 33% of the total number) were discovered with the above-average motor and sensory perception level.

Table 1: Test results of Wechsler's scale of general intellect.

Test	No. of improved results	Percentage improvement
Dice	8	33%
Jigsaws	7	30%
Coding	3	8%

The successfulness of the trial schooling was assessed by inspection and questionnaires for students as well as for teachers. Three criteria were determined to evaluate the teachers:

- pedagogical climate (the way the teacher treats the students and creates interaction between teacher and student, i.e. how does the teacher manage to cooperate with students),
- management and organization of the class (the way the teacher organizes tuition and prepares the classroom environment),
- didactics (the way the teacher instructs and employs suggested methods).

The questionnaires of the students showed a positive assessment of the trial lessons (in total 115 students, 83% of them rated the lessons as definitely favorable). The children were most attracted by following:

- manual work, meaning creating own items,
- the possibility to show their products, and cooperation with classmates,
- the possibility to try out basic practical skills and technical coherence while playing games,
- additional tasks for skillful students.

The teacher's evaluation consisted mostly of the following assessments:

- appreciation of connection of practical work with a theoretical level of teaching,
- very well prepared and comprehensive basic information from the fields of technology, music and natural science,
- some experiences show the necessity to adjust the choice of tasks to the curriculum of the given class,
- teachers got new insight at their student from a different point of view.

Other recommendations and conclusions were gathered during inspections in individual classes. These

observations show the most efficient method of managing students is to divide them into small groups of four or five. It is possible to delegate a skillful student to lead such small group. The spatial conditions in the classroom have to be adjusted to prevent groups of student students to disturb each other while allowing the teacher to maintain the overview of the events in the whole classroom. The crucial point to keep in mind is that the creativity of such young students is always influenced by the creative attitude of the teacher.

CONCLUSIONS

The summary of the overall results of cognitive abilities of the testing group concludes, that there were no major differences between girls and boys in the testing group; one-third of the student improved in practical thinking and analytic-synthetic abilities. The improvement was up to 30%; one-third of tested students showed above-average potential in motor and sensory perception. There were several aspects that contributed to reaching good results. The students had very good ability to work, working habits and showed no attention deficit. Also, they had adequate aspiration level and motivation to succeed. The testing group involved several children that had passed through the project "Workshops" (mentioned at the beginning of this paper) during their time in kindergarten. The verification of all manuals during monitoring teaching proved that the students were interested in all themes provided by the project and resulting manuals. Always the role of the teacher is crucial, as it can initiate inner motivation of the students.

Technical abilities (especially in the younger schoolchildren) have the same potential as any other natural ability and thus it cannot be left to only spontaneous development. Students always need systematic training, fine guidance of teachers and a support of their family to achieve their potential maximum in the future. A standing support and motivation are required to learn and use new information from the fields of technical and nature science in praxis.

The content of the project „Technical kindergarten“ is focused on the basics of technical knowledge and natural science, thus enriching the current curriculum in the first years of primary school.

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References

- Dinkmeyer, D., & McKay, G. *Efektivní výchova krok za krokem*, Praha, Portál 1996
- Cangelosi, J., S. *Strategie řízení třídy*, Praha, Portál 1996
- Havelkova, B., Kovarova, E., Dvorakova, H., & Hlouchova, H. (2015) *General methodical manual* [On-line], Available: www.technickeskolky.cz/files/manual_obecny_metodicky.pdf
- Havelkova, B., Kovarova, E., Dvorakova, H., & Hlouchova, H. (2015) *Successfulness study* [On-line], Available: www.technickeskolky.cz/files/studie_hodnoceni_uspesnosti.pdf
- Novotna, O. *Metodika Začít spolu*, PF MU,ZS Veřstova, Brno, 2008

Technology Integration In The Context Of Brunei Primary Schools

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ABSTRACT

Integrating technology effectively into teaching and learning, teachers should acquire the knowledge of Technological Pedagogical and Content Knowledge (TPACK) and also the 21st Century Learning Design (21CLD). This study examines the levels of teachers' integration of technology and also investigating the students' view on the use of technology in their classroom. Thirty classroom observations were conducted at three schools from three different districts using a TPACK observation instrument and 21CLD rubrics. A total of eight teachers were observed and thirty students were involved in five different focus group interviews. The results of the research show that the teachers' use of technology integration was at the developing stage. In terms of students' views on technology use in the classroom, the results showed that they like instructions with technology especially for better learning, games and using software. The main issue that arose by the students during the interview was that there were not enough games in their lessons. They believed that instruction with digital technology has a positive impact on their learning as they become motivated when using it. From the results, it can be concluded that most teachers are still at the developing stage in using technology in their teaching; this is supported from the students' interviews that indicated there was not enough technology in terms of gaming used in their classroom.

Keywords: Technology Integration; Primary Schools, TPACK, 21CLD

INTRODUCTION

Technology integrations can be successful when they are rooted primarily in curriculum content and content-related learning processes, and secondarily in smart way uses of educational technology (Harris et al., 2009). Educational Technologies have been exposed and provided to teachers in their teaching. The technologies provided in schools come in many ranges such as desktop computers, Apple MacBook's, Interactive Boards and iPad. Most teachers in Brunei might not know how to integrate these technologies in their teaching. Most teachers only use the educational technology as a tool to deliver their teaching. The teachers may have not realized about the importance of how to use the digital technology effectively in their teaching. Most teachers do not realize the digital technology tools provided by the Government can be used innovatively to give an impact in their teaching. Some teachers or the public might say it was just a waste of time or money using digital technology (Norbu & Salleh, 2014). McCormick (1999) stated that although a large amount of money has been invested into technology, the impact of technology is disappointing where there has been only little benefit and changes. What McCormick has said about disappointing might be because how the teachers used the technology was not effective or essential in integrating the technology in their teaching.

Digital technology or Information and Communications Technology (ICT) cover any product that can store, retrieve, manipulate or transmit information electronically in a digital form. Some examples of ICT include Microsoft Word, Excel, PowerPoint, Adobe InDesign, Photoshop and Illustrator, email, videoconferences, digital cameras, CD-ROMs, fax machines, and the World Wide Web (Firmin & Genesi, 2013). Roblyer and Doering (2013) stated that digital technology could play an important role in inquiry oriented science instruction. Technology integration strategies for science instruction support involving students in scientific inquiry through authentic online projects. Currently in Brunei, teachers are trained using inquiry based science education (IBSE) and integrating it using digital technology. With the initiatives of the *e-Hijrah* programme, some schools in Brunei have been equipped with the iPad for the use of teaching and learning. The programmes were '*1:1 Computing in Model Schools*' and '*Projek Rintis – iPad for Schools*'. The teachers have attended professional development courses on the uses of the iPad but they might not know at what stage they are at when integrating technology using iPad in their teaching. The public in Brunei might also not know the impacts of using iPad to the students in the schools. Empirical studies mentioned by McDougall and colleagues (2010) showed that short professional development to train teachers in the use of technology had mostly focused on technical aspects of

the technology being used. Teachers were not taught how to revise pedagogical practice with the technology. And in Brunei, researches conducted mainly focused on the pedagogical aspects of classroom practices (Microsoft, 2014; Shahrill, 2009; Shahrill et al., 2013; Shahrill et al., 2014). This study may prove significant in contributing to investigate issues of learning and teaching using technology for quality research that will advance knowledge and inform improved practice (McDougall et al., 2010). The significance of the research assessment study was to assess the teachers on how well or at what level of quality of technology integration the teacher had currently. The lesson planning was observed because according to Britten and Cassady (2005) it is critical to the successful infusion of technology in planning the connections among standards, best practices in teaching, and uses of technology; and most importantly the involvement of school leaders as the initiators, motivators and implementers of technology in their schools (Salleh & Laxman, 2014b).

The main purpose of this present study was to investigate how Brunei primary school teachers brought about the use of educational technology, which is the iPad or the interactive whiteboards in teaching and learning in their classrooms. And also what were the impacts of technology integration to the students when used innovatively and effectively. The specific aims of the study were, to assess to what extent do the teachers integrate technology effectively in their teaching, and to investigate the students' view on the use of technology in their classroom. The following research questions were formulated to elicit data to achieve the purpose of the study: To what extent do the teachers integrate technology in their teaching and learning in the primary classroom? And what are the students' views on the use of technology in their classroom? This study only focused on the schools equipped with the current digital technology such as computers, Internet, iPad and interactive whiteboards. The teachers that were observed had to be the teachers who were already trained and had attended professional developments on the use of technology in their teaching and learning. The time to collect the data from the three primary schools was four months only.

THEORETICAL FRAMEWORK OF THE RESEARCH

TPACK is a type of knowledge that supports content-based technology integration that has been characterized as the multiple intersections of teachers' knowledge of curriculum content, general pedagogies, technologies, and context. The TPACK influences teaching and learning when technology is integrated in the classroom (Kim et al., 2013). TPACK is an extension of Shulman's study (as cited in Hofer et al., 2011) of pedagogical content knowledge, which is the specialized knowledge required to teach differently within different content areas that revolutionized our understanding of teacher knowledge and its development. The TPACK is knowledge that results from teachers' understanding of content, pedagogy, technology, and learning contexts, it is learned mainly by four intersections of knowledge types as shown in Figure 1. The pedagogical content knowledge (PCK) is the Shulman's construct about how to teach specific content-based material. The technological content knowledge (TCK) is how to select technologies that best embody and support particular content-based precepts. The technological pedagogical knowledge (TPK) is how to use particular technologies in teaching. The Technological Pedagogical Content Knowledge (TPACK) is how to teach specific content-based material, using technologies that best represent and support it, in ways that are appropriately matched to students' needs and preferences (Harris et al., 2009).

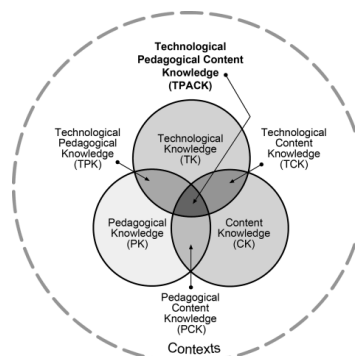


Figure 1: Technological Pedagogical Content Knowledge (Kim et al., 2013)

TEACHERS' USE OF TECHNOLOGY IN THEIR TEACHING

There is quite extensive research on factors influencing teachers' use of technology in their teaching. However, in this review, the foci are on attitude, subjective and control factors (Salleh & Laxman, 2014a); approaches to theoretical model of technology integration using TPACK framework (Harris et al., 2009); and the development of TPACK-based technology instrument (Harris et al., 2010; Hofer et al., 2011). A study by Salleh & Laxman (2014a) showed that Bruneian teachers are influenced by their attitudes, the subjective norms and the control

factors. From that study, the attitudes are the teachers' liking, enjoying and feeling comfortable during teaching when using technology. The subjective norms are the social factors such as the principal and the head of department that are influencing the use of technology. The control factors are the capability and having the resources, the knowledge, and the skills to use technology effectively and successfully. The relevance of the study was helpful in selecting the participants to be used for this research. The participants used were the schools that had the resources and the teachers that had the knowledge and skills to use the technology.

Harris and colleagues (2009) critically analyzed existing approaches to technology integration in teaching, arguing that many current methods are technocentric. Most approaches are neglecting the concern of the dynamic and complex relationships among content, technology, pedagogy and context. In addition, Britten and Cassady (2005) designed a Technology Integration Assessment Instrument (TIAI) to assess how the technology is used and on how the technology is integrated to pedagogical features such as assessment, individualized attention to student needs, and addressing educational standards. The TIAI developed by Britten and Cassady (2005) provides for ratings across seven dimensions of a lesson plan, with four levels of classification within each dimension. The classifications represent a continuum of technology integration; the labels are (a) Technology Not Present, (b) Non-Essential Technology Component, (c) Supportive Technology Component, and (d) Essential Technology Component. That study was adapted and tested by Harris et al. (2010) to design the *technology integration assessment rubric*. The study was to check the reliability and validity of assessing the lesson plans of the teachers integrating technology using the rubric designed. The results of their study, using Intraclass Correlation Coefficient (ICC) calculations, percent agreement computations, and the Cronbach's Alpha measure, concluded that the rubric has an adequate reliability to be recommended for further use. The implication of that study was to have further study on assessing the TPACK of the technology integration in an observed classroom. From that study, design and implication, the technology integration assessment rubric has evolved to *TPACK-Based technology integration observation instrument* study that was tested by Hofer et al., (2006). Their study was to check the reliability and validity of the Technology Integration Observation Instrument of the teachers teaching in the classroom. They discussed the results of reliability testing across 11 judges using ICC calculations, percent agreement computations, and the Cronbach's Alpha measure, and concluded that the instrument has comparatively strong reliability and they were confident in recommending it to assess TPACK in observed lessons. The instruments were used in that study to pre-service and in-service teachers. The researchers were pleased to place the instrument in the public domain for its use to share experience using the instruments. This instrument was useful for this research to assess to what extent the teachers are integrating technology in the teaching and learning in the classroom. The instrument's inter-rater reliability coefficient was 0.80 and the internal consistency (Cronbach's Alpha) was 0.91. Test-retest reliability (score agreement) was 93.9% (Hofer et al., 2011).

THE STUDENTS' VIEW ON THE USE OF TECHNOLOGY IN THEIR CLASSROOM

There was not a lot of review research investigating students' views on the use of technology in their classroom. There is research by Sad & Ozhan (2012) where they investigated the views of primary students about interactive whiteboard use in classes from attitudinal and pedagogical perspectives. The article also determined the aim to evaluate the quality of instruction with IWB by outlining its weaknesses and strengths based on the students' views. The research data collected from the focus group interviews were used to gain unique insight of existing beliefs, behaviours and attitudes. The researchers prepared three open-ended semi-structured research questions: What do you like the most about having IWBs in your class? ; What do you like the least about having IWBs in your class? ; How does instruction with an IWB enhance your learning? The data collected from the study was then transcribed and analysed using Nvivo 9 qualitative data analysis software. The qualitative data was analysed into three successive steps which were data reduction, data display and conclusion drawing/verification. The analytical data reduction choices were made in consideration with the research questions. Clusters of meaning were inductively developed from participants' significant statements into themes. The data display step assembled organized information into accessible compact form. The results from the study showed that practical and economical use of IWBs was the most liked feature. The least liked about instruction with IWB was the technical problem. The findings discussed that the students were uncomfortable with the interruptions and distractions caused by the power cuts, the unintentional shut downs, the impaired colour settings, the virus program constantly blocking the screen, and the decalibration. The most disturbing technical problem was the recalibration. The students' views about how the technology could enhance their learning were categorised into visualization and contextualization, effective presentation, test-based use, motivation, and student participation and interaction. Most students believed that IWBs helped visualization and contextualization better making them better in learning.

METHODOLOGY

The methodology described in the literature reviewed is relevant to this current study. In this current study, the methodology was replicated in the Bruneian context. Using the focus group open-ended semi-structured interview helped collect data on investigating the views of the students' on the use of technology in their classroom. The method on analysing the data collected was completed by making chunks of code that were used to categories the response given by the students during the interview. Consequently, this present study used a mixed methods approach to answer the research questions.

Participants

The sample for this study was from three primary schools from three different districts in Brunei, which were Temburong, Tutong and Belait districts. Eight teachers were randomly selected to assess their teaching using technology. The teachers had a mean of 2.13 years with standard deviation of 0.35 teaching experience using digital technology. Since the focus of the study was to assess the technology integrations in primary schools, it was essential to select the schools which had the teachers that were already trained and had attended professional developments on technology integration and also had sufficient amounts of equipment for technology integration in the classroom. A total of 30 students were randomly selected for the focus group interview. Five focus groups were conducted and each group has six students with mixed abilities.

Data Collection

The techniques used to assess the teachers' integration of technology were by using the TPACK-based technology integration observation instrument, the 21CLD learning activity rubric and the 21CLD student work rubric. A total of 30 classroom observations were done to collect the data. Ten lessons from each school were observed and the subjects ranged between Science, Mathematics and English. We should also note that the pilot studies were conducted three times at a school that had about the same context as the intended sample for the research.

TPACK-based technology integration observation instrument

This instrument was used to assess classroom observation on the use of technology in teaching and learning (Hofer et al., 2011). The rubric presents a scoring of performance from 1 to 4 (*Entry (1), Developing (2), Approaching (3) and Ideal/Target (4)*) for each of the 6 criteria of *curriculum goals and technologies, instructional strategies and technologies, technology selections, fit, instructional use, and technology logistics*. The instruments have been tested and it was valid and reliable to use (Harris et al., 2010; Hofer et al., 2011). The instruments were tested for reliability as discussed in the literature review with inter-rater reliability coefficient of 0.80 and the internal consistency (Cronbach's Alpha) of 0.91.

21CLD observation coding instrument

In order to keep up with infinite information in a world without boundaries, educators were challenged and emphasized developing a 21st century skills in students' educational development (Saavedra & Opfer, 2012). The instruments that consisted of the 21CLD learning activity and the 21CLD student work rubrics (Microsoft, 2014) were used to assess and score the coding of 21st century skills of the classroom learning activity and students' work. The six dimensions of 21st century learning design (21CLD) that are considered significant for students development are; collaboration, knowledge construction, self-regulation, real-world problem-solving and innovation, the use of ICT for learning and skilled communication (Microsoft, 2014). For the first research question, only four dimensions out of the six, from the 21CLD learning activity and the 21CLD student work, were used to assess during the classroom observation. The four dimensions were the *knowledge construction, the use of ICT for learning, the collaboration and the skilled communication*.

The second research question focused on investigating the views of the students' on the use of technology in their classroom. Five focus group interviews were conducted to collect the data for the second research question. Adapted from Sad and Ozhan (2012), three open-ended semi-structured questions were asked to the five focus groups of students: What do you like most about having digital technology in your classes? What do you like the least about having the digital technology in your classes? How does instruction with the digital technology enhance your learning? Probing questions were asked during the focus group interviews to obtain in-depth information. The interviews were digitally recorded and field notes were taken to identify the students who spoke during the interview. The students who were interviewed were assigned pseudonyms from *Student 1* to *Student 30*. The five focus groups were categorised into *Group 1, Group 2, Group 3, Group 4 and Group 5*.

Analysing of data

All the data from assessing the classroom observations were input into a SPSS version 21. The data was analysed using descriptive statistics for its frequency and percentage. The data from the interviews was transcribed into

the Microsoft word. The common categories across the entries for each question were analyzed and identified. The frequencies of the common categories were counted for frequency and arranged from the largest number of entries to the least.

RESULTS AND DISCUSSIONS

Quality of Technology Integration of Teachers in their Teaching

The results and discussion of the quality of technology integration of teachers in their teaching are divided into Technological Pedagogical And Content Knowledge (TPACK), 21CLD learning activity and 21CLD student work. Each of these results and discussion will be examined in further detail below. The percentages of the scores from 30 classroom observations using the TPACK-based technology observation instrument are presented in Table 1.

Table 1: Distribution into stages of TPACK-based technology observation instrument

Stage	TPACK-based technology observation instrument criteria (%)					
	TPACK 1	TPACK 2	TPACK 3	TPACK 4	TPACK 5	TPACK 6
Entry	23%	0%	0%	0%	7%	0%
Developing	53%	47%	80%	80%	40%	40%
Approaching	23%	53%	20%	20%	53%	60%
Ideal/Target	0%	0%	0%	0%	0%	0%

Referring to Table 1, the majority of TPACK 1 (53%) was at the developing stage. The TPACK 1 is the criteria for curriculum goals & technologies, which are matching the technology to the curriculum. The finding shows that technologies used in the lesson were partially aligned with one or more curriculum goals. This suggests that the teachers need more improvement on the technological content knowledge (TCK) on how to select technologies that best embody and support particular content-based precepts. It can also be seen only 23% on TPACK 1 of the lessons observed were at the approaching stage. TPACK 2 is the criteria for instructional strategies and technologies. The TPACK 2 results show 53% of the lessons observed were at the approaching stage. This suggests that the technology used by the teachers support instructional strategies. This could be due to the professional development attended by the teachers on the technicality use of the technology supplied such as the tablet and interactive board. The mean of the teaching experience using technology of the teachers is 2.13 years with standard deviation of 0.35. Even though the teachers' only have two years' experience using the technology in their teaching, it showed they have a major starting point on the technological pedagogical knowledge (TPK) on how to use particular technologies in teaching. The TPACK 3 shows the result of the technology selections made by teachers to match both curriculum and instructional strategies. 80% of the thirty lessons observed were at the developing stage. It shows that the technology selections were marginally appropriate with the curriculum goals and instructional strategies. The TPACK 4 shows the technological pedagogical content knowledge (TPACK) score on how the teachers teach specific content-based material, using technologies that best represent and support it, in ways that were appropriately matched to students' needs and preferences. 80% of the lessons observed were still at the developing stage. This could be due to the technological content knowledge of the teachers being still at the developing stage. The technology integration of the teachers' lessons can be improved by planning their lesson using the TPACK framework. TPACK 5 is the implementation of using technologies effectively for instruction. 53% were at the approach stage where the instructional uses of technologies were effective in the observed lessons. The operating of technologies effectively from the TPACK 6 result shows that 60% of the thirty lessons observed were at the approaching stage. The teachers and students could operate the technologies well in the observed lessons and enjoyed using the technologies. Salleh and Laxman (2014a) reported that Bruneian teachers are influenced by their attitudes, and also the teachers' liking, enjoying and feeling comfortable during teaching when using technology. This could be due to the accessibility of the technologies such as the tablets and the IWB to the teachers and the students. All the classrooms observed were equipped with the IWB and there were enough tablets for each one of the students to use.

21CLD Learning Activity

A learning activity is any task that students do as part of their school-related work such as an exercise or a project that are prepared by the teachers (Microsoft, 2014). Only four out of the six dimensions of the 21CLD learning activity rubric were assessed during the classroom observations. The four dimensions used were knowledge construction, use of ICT for learning, collaboration and skilled communication. Referring to Table 2, 23 of the 30 lessons observed were coded at 2, where the students used ICT for their learning activities. But the coding of 2 for this learning activity did not require the students to use ICT to support their learning. The finding shows that the learning activities observed did not give the students the opportunity to use ICT to the extent of

developing the skills to design and create new information and ideas using ICT. In only two classroom observations it was found that the learning activities using ICT supported the students' knowledge construction. During the classroom observations, it was observed that most of the uses of ICT by the students were only for answering questions. The tablets were mostly used as a substitute for writing books and printed worksheets. The finding also shows that most of the teachers have not acquired the skills and methods to design a lesson that requires the ICT to support the students' knowledge construction.

Table 2: Distribution of the 21CLD learning activity coding on the use of ICT for learning dimension

21CLD learning activity rubric: Use of ICT for learning coding	Freq.	%
1) Students do not have the opportunity to use ICT	5	16.7
2) Students use ICT	23	76.7
3) Students use ICT to support knowledge construction	2	6.7
4) ICT is required for constructing this knowledge	0	0
5) Students are designers of an ICT product	0	0

Table 3 shows that only 26.7% of the classrooms observed had learning activities whereby students had to have shared responsibility during pair or group activities. In addition, from Table 3 only two learning activities required the students to work in pairs or groups but did not state the instruction for the students to have shared responsibility. Without giving instructions in the learning activity to the students to have shared responsibility, one or more of the students in the group may just be watching or only helping.

Table 3: Distribution of the 21CLD learning activity coding on the collaboration dimension

21CLD learning activity rubric: Collaboration coding	Freq.	%
1) Not required to work together in pairs or groups	20	66.7
2) Students are required to work in pairs or groups	2	6.7
3) Students have shared responsibility	8	26.7
4) Students make substantive decision together	0	0
5) Students' work is interdependent	0	0

As Table 4 shows, only one learning activity's main requirement from the classroom observation was knowledge construction and it did require the students to apply their knowledge in a new context. Table 4 also shows that the learning activities that had been coded at 3 were found during four class lessons. At code 3 of the knowledge construction coding, the learning activity is knowledge construction as the main requirement. Knowledge construction requires the students to interpret, analyse, synthesize, or evaluate information or ideas (Microsoft, 2014).

Table 4: Distribution of the 21CLD learning activity coding on the knowledge dimension

21CLD learning activity rubric: Knowledge construction coding	Freq.	%
1) No knowledge construction	21	70
2) Requires knowledge construction	4	13.3
3) Main requirement is knowledge construction	4	13.3
4) Students apply their knowledge in a new context	1	3.3
5) Learning activity is interdisciplinary	0	0

Table 5 below shows the coding of the skilled communication learning activity during classroom observation. From Table 5, only one of the classrooms observed incorporated a learning activity that required students to produce multi-modal communication and they were required to provide supporting evidence. That lesson's activity required the students to choose their own software applications to create their presentation.

Table 5: Distribution of the 21CLD learning activity coding on the skilled communication dimension

21CLD learning activity rubric: Skilled communication coding	Freq.	%
1) Students are not required to produce extended or multi-modal communication	26	86.7
2) Students are required to produce extended communication or multi-modal communication	3	10
3) Students are required to provide supporting evidence OR to design their communication for a particular audience	1	3.3
4) Students communicate to a particular audience	0	0

21CLD Student Work

21CLD student work is what the students produced when they have completed the learning activity (Microsoft, 2014). Table 6 shows the results of the implementation of the students' work on the use of ICT for learning. One lesson observed required the students to use video to observe and analyse the life cycle of the butterfly. The students were constructing knowledge to learn something that was new to them. ICT was required for the activity because it would take a greater amount of time if the students were observing the real life cycle of the butterfly from the egg stage to the adult stage.

Table 6: Distribution of the 21CLD student work coding on the use of ICT for learning dimension

21CLD student work rubric: Use of ICT for learning coding	Freq.	%
1) Students work does not demonstrate ICT use	5	16.7
2) Students used ICT	23	76.7
3) ICT supported students' knowledge construction	2	6.7
4) ICT was required for constructing knowledge	0	0
5) Students designed an ICT product with attention to specific users.	0	0

Table 7 shows distribution of frequency and percentage for the students' work on collaboration dimensions of the 21CLD. Referring to Table 3, it can be seen that eight learning activities required the students to have shared responsibility during the group work. From Table 7, it was found that the implementations of the shared responsibility were not observed during the students group work. It is possible that the teachers were not facilitating the students' group work effectively that resulted in the students failing to have shared responsibility fairly.

Table 7: Distribution of the 21CLD student work coding on the collaboration dimension

21CLD student work rubric: Collaboration coding	Freq.	%
1) Students are not working together in pairs or groups	20	66.7
2) Students are working together	10	33.3
3) Students are sharing responsibility fairly	0	0
4) Students make substantive decision	0	0
5) Work product is interdependent	0	0
Total	30	100

Table 8 shows that the students did not demonstrate conceptual understanding. From Table 4, there was one learning activity that required the students to apply their knowledge in a new context. But the result in Table 8 shows that the activity given to the students was not effective in enabling students to demonstrate conceptual understanding. To get a higher level of collaboration, teachers should design the learning activity so that the students have shared responsibility for their work, and the learning activity is designed in a way that requires students to make substantive decisions together.

Table 8: Distribution of the 21CLD student work coding on the knowledge construction dimension

21CLD student work rubric: Knowledge construction coding	Freq.	%
1) Students work does not demonstrate knowledge construction	21	70
2) Students work does demonstrate knowledge construction	4	13.3
3) Student's main effort was knowledge construction	5	16.7
4) Students demonstrate conceptual understanding	0	0
5) Students apply their knowledge or the work is interdisciplinary	0	0

Table 9 shows that one student work activity from one classroom observed had achieved in the students being able to do multi-modal communication and the students did their work with sufficient supporting evidence.

Table 9: Distribution of the 21CLD student work coding on the skilled communication dimension

21CLD student work rubric: Skilled Communication coding	Freq.	%
1) Communication is not extended or multi-modal	26	86.7
2) Communication is extended or multi-modal	3	10
3) It does contain sufficient supporting evidence or it is designed appropriately for a particular audience	1	3.3
4) Designed appropriately for a particular audience	0	0

Impacts on the Students' View on the use of Technology in their Classroom

The results and discussion for the impacts on the students' view on the use of technology in their classroom is divided into 3 parts: what students like the most about digital technology, what students like the least about digital technology and how instruction with digital technology enhances students' learning.

What do students like the most about digital technology? The analysis of the interview contents revealed basic categories about the most liked properties of digital technology use in their lessons. These categories are listed vertically in Table 10 from the most to the least referenced among the different groups. It was found that the highest number of students referenced *better learning* with digital technology in their classroom [*"Easy to learn"* (Group 6)] as what they most like about digital technology, but other research findings by Sad and Ozhan (2012) found this to was the least referred.

Table 10: Distribution on what students like the most regarding digital technology

Categories	Number of references by group (f)					Total
	Group 1	Group 2	Group 3	Group 4	Group 5	
1. Better learning	3	3	3	3	6	18
2. Games	3	3	5	3	3	17
3. Software / apps	3	3	3	5	0	13
4. Hardware	2	1	1	1	2	7
5. Multimedia	1	0	0	0	1	2
Total	12	10	12	12	12	57

The second most appealing feature of the digital technology referred to by the groups was the *games* [*"The games are fun"* (Group 3)]. The students stressed that the games motivate them to learn [*"The games can make us want to learn"* (Group 2)]. This suggests that the students like to play games when they are learning. The *software* was also referred to many times by the students [*"Pic Collage, Edu Creation, Book Writer"* (Group 4)]. It shows that the students know much about the software they used. This coincides with the result of the TPACK on the technology logistics, where the students operate technologies well in the observed lesson. The *hardware* was not referred as much as the *software*, which means that the students are more interested in the software rather than the hardware. The only referred to type of hardware during the interviews was the iPad. The least referred to category was the *multimedia*, which is the Internet and watching videos on YouTube [*"It is fun because we can access the internet to watch YouTube"* (Group 1)]. This feature was referred to the least maybe due to the learning activity prepared by the teachers not requiring the students to access the internet that much.

What students like the least about digital technology? The analysis of the interview contents revealed basic categories about the least liked properties of digital technology use in their lessons. These categories are listed in Table 11 from the most referred to, to the least among the different groups.

Table 11: Distribution on what students like the least regarding digital technology

Categories	Number of references by group (f)					Total
	Group 1	Group 2	Group 3	Group 4	Group 5	
1. Minimal games	1	1	3	5	1	11
2. Nothing	2	1	1	1	2	7
3. Cannot bring home	1	0	0	0	1	2
Total	4	2	4	6	4	20

The most referred to category about the least liked aspects regarding the digital technology in the students' classroom was having *minimal games* in their lesson [*"Do not have many games"* (Group 4)]. Although the students referred to games as only the second most liked feature of the digital technology in the classroom, they still felt the game-based learning in their classroom was not enough. The students demonstrated positive attitudes toward the use of game-based learning, which was previously reported by Liu and Chen (2013). The second most referred to statement of the students is *"nothing"*. They had nothing to dislike about having digital technology in the classroom. This suggests that many students like everything about the digital technology in their classroom [*"Nothing at all. We like everything"* (Group 4)]. Two students referenced that they *cannot bring home* the iPad that was one of the least referred to issues about the digital technology that they have in their classroom [*"Cannot bring the iPad back home"* (Group 1)]. This issue about bringing home the hardware could not be addressed by the school due to maintaining the safety of the hardware.

How instruction with digital technology enhances students' learning? The analysis of the content from the focus group interviews revealed views about how instruction with digital technology facilitates students' learning. Resulting categories were listed in Table 12 from the most to the least referred to across different groups.

Table 12: Distribution on how instruction with digital technology enhances students' learning

Categories	Number of references by group (f)					Total
	Group 1	Group 2	Group 3	Group 4	Group 5	
1. Motivation	1	5	3	2	5	16
2. Finding information	3	1	0	0	1	5
3. Student participation and interaction	0	0	2	2	0	4
4. Effective presentation	0	0	2	1	0	3
5. Visualization	0	1	0	0	0	1
Total	4	7	7	5	6	29

The students of Groups 2 and 5 especially, believed that the instruction with digital technology *motivates* them to learn [*"Getting energetic" (Group 2)*] [*"To make us eager to learn" (Group 5)*]. Sad and Ozhan (2012) also reported that the students agreed that the ICT on its own aroused interest and curiosity contributing to enhance student learning. Students in Group 1 referenced that the instruction with digital technology enhanced their learning because they could *find information* they wanted [*"We can get information from the internet" (Group 1)*]. It is true that they could find information for them to learn because the results from the 21CLD learning activity and student work shows the students were mostly using ICT during their lesson.

Student participation and interaction had quite a number of references by the students during the interview [*"We can make a poster using iPad" (Group 3)*] [*"We can do our work together" (Group 3)*]. Preston and Mowbray (2008) reported that the students need hands on activities, and students prefer having sufficient opportunity to use the ICT themselves for better learning. Students pointed out that they could make and create *effective presentations* for their task and activity [*"We can share our work with our teacher and friends using iPad" (Group 3)*]. Although the skilled communication of the students' 21CLD result shows they did not do extended or multi-modal communication, they still did their work using ICT. Only one student mentioned about *visualization* of the digital technology [*"Attractive" (Group 2)*]. Research by Sad and Ozhan (2012) showed that visualization was the most highlighted by their students for better learning.

CONCLUSIONS AND RECOMMENDATIONS

The results obtained in this study indicated that the qualities of the TPACK learning activity prepared by the teachers are at the *developing* stage. This can be considered good because most of the teachers have been integrating the technology into their teaching for only two years. From the thirty classroom observations, the majority of the eight teachers observed had designed or prepared their learning activities at the low level on the dimensions of the knowledge construction, the use of ICT for learning, the collaboration and the skilled communication of the 21st century learning design (21CLD) rubric. For the knowledge construction learning activity, only one learning activity was coded 4; and the highest coded for the learning activity with the use of ICT for learning were two lessons. For the collaboration learning activity, only eight lessons were coded to 3, which is the activity that requires students to have shared responsibility. There was only one lesson that required the students to provide supporting evidence and it was multi-modal.

During the implementation of the learning activities, the students' work was also coded to find if the learning activities prepared by the teachers achieved their target. It turned out that some learning activities had and some had not achieved their expected outcomes. The learning activities with the use of ICT for learning and the skilled communication dimensions had achieved the same outcomes during the implementation of the students work. One learning activity that required the students to apply their knowledge in a new context did not achieve its planned target because the students did not demonstrate conceptual understanding during their work. Eight lessons were designed for the students to have shared responsibility when they were doing their work, but during the implementation of the group activities, the students were not sharing responsibility fairly. These results suggest that the teachers and students were capable of operating the technologies and effective in the instructional use of ICT, but the technologies used were only partially aligned with the curriculum goals. The availability of technologies to fit with both the curriculum and instructional strategies were not abundant. The teachers should not only be given professional development on the technical use of the technology, but also it is very important to train the teachers in the technological pedagogical and content knowledge. The teachers should also be trained to design learning activities using the 21st century learning design.

With respect to the views of the students about digital technology use in their classes, the results indicated that what students liked the most about instruction with digital technology was better learning, playing games, using software, using digital technology hardware and multimedia. The problem with the digital technology in their classroom was not having many games in their lessons. But most of them said that they do not have any problem with the digital technology in their classroom. The students were found to believe that instruction with the digital technology enhanced their learning thanks to such factors as motivation, finding information, student participation and interaction, effective presentation and visualization. The learning activities should have more student participation and interaction as reported by Preston and Mowbray (2008), that the students should have sufficient opportunity to use the ICT themselves for better learning. These results concur with the findings by Liu and Chen (2013), whereby it can be suggested that to improve learning, game-based learning should be integrated into the teaching and learning. Further studies are therefore necessary to find the impact of game-based learning to the teaching and learning in the classroom.

References

- Firmin M. W., & Genesi, D. J. (2013). History and implementation of classroom technology. *Procedia - Social and Behavioral Science*, 93, 1603-1617.
- Goodwin, K. (2012). *Use of tablet technology in the classroom*. Education and Communities. Retrieved from: www.clic.det.nsw.edu.au
- Harris, J., Grandgenett, N., & Hofer, M. (2010). Testing a TPACK-Based Technology Integration Assessment Rubric. In D. Gibson & B. Dodge (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2010* (pp. 3833-3840). Chesapeake, VA: AACE.
- Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education*, 41(4), 393-416.
- Hofer, M., Grandgenett, N., Harris, J. B., & Swan, K. (2011). Testing a TPACK-Based Technology Integration Observation Instrument. Teacher Education Faculty Proceedings & Presentations. Paper 19, 2011. Retrieved from <http://digitalcommons.unomaha.edu/tedfacproc/19>
- Koehler, M., & Mishra, P. (2009). Technological pedagogical content knowledge (TPACK) [diagram]. Retrieved from <http://www.matt-koehler.com/tpack/wp-content/uploads/TPACK-new.png>
- Kim, C. M., Kim, M. K., Lee, C., Spector, J. M., & DeMeester, K. (2013). Teacher beliefs and technology integration. *Teaching and Teacher Education*, 29, 76-85.
- Liu, E. Z. F., & Chen, P. K. (2013). The effect of game-based learning on students' learning performance in science learning – A case of "Conveyance Go". *Procedia - Social and Behavioral Sciences*, 103, 1044-1051.
- McCormick, R. (1999). Curriculum Development and New Information Technology. Centre for Technology Education, The Open University, UK. Retrieved <http://rice.edn.deakin.edu.au/Archives/JITTE/j113.htm>
- McDougall, A., Murnane, J., Jones, A., & Reynolds, N. (2010). Researching IT in Education: Theory, Practice and Future Directions. London: Routledge.
- Microsoft (2014). 21st Century Learning Design. Retrieved from <http://www.educatornetwork.com/PD/21CLD/Overview/>
- Norbu, U., & Salleh, S. M. (2014). Investigating the factors influencing Bhutan's teachers' use of ICT in teaching. *Proceedings of the International Technology, Education and Development (INTED) Conference*, (pp.1754-1765). Valencia, Spain: IATED.
- Preston, C., & Mowbray, L. (2008). Use of smart boards for teaching, learning and assessment in kindergarten science. *Teaching Science*, 54(2), 50-53.
- Roblyer, M. D., & Doering, A. H. (2013). Integrating Educational Technology into Teaching (Sixth Edition). Boston: Pearson.
- Saavedra, A. R., & Opfer, V. D. (2012). Teaching and Learning 21st Century Skills: Lessons from the Learning Sciences. A Global Cities Education Network Report. New York: Asia Society. Retrieved from http://www.rand.org/pubs/external_publications/EP51105.html
- Sad, S. N., & Ozhan, U. (2012). Honeymoon with IWBs: A qualitative insight in primary students' views on instruction with interactive whiteboard. *Computers & Education*, 59, 1184-1191.
- Salleh, S. M., & Laxman, K. (2014a). Investigating the factors influencing teachers' use of ICT in teaching in Bruneian secondary schools. *Education Information Technology*, 19(4), 747-762.
- Salleh, S. M., & Laxman, K. (2014b). Headmasters and information and communication technology: Approaches in making the connections. *Research and Practice in Technology Enhanced Learning*, 9(2), 349 – 362.
- Shahrill, M. (2009). From the general to the particular: Connecting international classroom research to four classrooms in Brunei Darussalam. Unpublished doctoral dissertation, University of Melbourne, Melbourne, Australia.

- Shahrill, M., Mahalle, S., Matzin, R., Hamid, M. H. S., & Mundia, L. (2013). A comparison of learning styles and study strategies used by low and high math achieving Brunei secondary school students: Implications for teaching. *International Education Studies*, 6(10), 39-46.
- Shahrill, M., Abdullah, N. A., Yusof, J., & Suhaili, A. S. (2014). Informing the practice of teaching mathematics in upper primary classes. In I. Sahin, S. A. Kiray, & S. Alan (Eds.), *Proceedings of the International Conference on Education in Mathematics, Science & Technology* (pp. 168-172). Konya, Turkey: Necmettin Erbakan University.

The Comparison Of Self-Efficacy Beliefs Of Anatomy Between The First And The Second Class Students In Medical School

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ABSTRACT

Anatomy is a basic training in medical education. The first condition of being a good doctor and being able to take a good medical education is proficiency in human anatomy. In medical education anatomy trainings are generally given in the last two committees for first class students and during the full term for the second class students. The purpose of our study is the comparison of self-efficacy beliefs of Anatomy between the first class students who have met with Anatomy training recently in Medical School and the second class students who have completed Anatomy training.

276 first class students (127 boys, 149 girls) and 207 second class students (94 boys, 113 girl) have attended to our study. Surveys for gathering information (gender, age, the region where they came from, the place they have been residing) and self-efficacy belief scale of Anatomy have been applied to the students who have attended to the study.

Eventually, the relation between the data from the surveys for gathering information and the levels of self-efficacy beliefs have been investigated. Furthermore, self-efficacy beliefs of Anatomy of the first class students and the second class students have been compared and a significant difference has been found ($p < 0.05$). This difference has shown that levels of self-efficacy beliefs of the students who have taken nearly one year Anatomy theoretical and practical training have increased. In the following years of these students' education a good anatomy knowledge and increased levels of self-efficacy beliefs of Anatomy will contribute to being able to be more successful doctors.

INTRODUCTION

In Medical Education, the lessons taken from the Department of Basic Medical Sciences-Anatomy constitute a basis for the lessons in future terms. The first condition for a good medical education and correspondingly, to be a good physician is possible by recognizing and knowing well about the human body and the anatomic structures which constitute it. The students in the 1st and 2nd terms in medical educations take Anatomy lessons which are qualified as the basics of medicine. Generally and as a method, the Anatomy education is given in medical faculties as Topographic Anatomy or Systematic Anatomy (Moore and Dalley, 2007; Yıldırım, 2013). In

Systematic Anatomy education, the systems are taken as the Skeleton System and Respiration-Circulation-Digestion-Urinary-Genital-Endocrinal-Neural-Sense Organs Systems and they are taught this way (Yıldırım, 2013). And in Topographic Anatomy Education, the parts of the body are separated into the head-neck, upper extremities, back-abdomen, pelvis, lower extremities and the perineum, thorax and they are taught this way (Moore and Dalley, 2007).

A student who takes education with both of these two methods shall have a good Anatomy knowledge and while using this Anatomy knowledge in clinical branches in future years of the medical education, they shall be able to understand the clinic better and by this means, their self-confidence shall increase.

The term “self-efficacy” is defined by Bandura (1977) as the one’s capability to overcome the challenges encountered in his life or his business. Self-efficacy which is a concept improved in the field of Social Psychology can be implemented according to needs in many different fields (Çolak S., 2013, Akkoyunlu B. and Orhan F., 2003).

There have been many studies which have used the self-efficacy belief in the fields of education (Zimmerman, 1999 Çolak S., 2013). Those studies have shown that the self-efficacy belief scale performs duty as a significant parameter in the field of education.

In our study, the self-confidences of the students who take Anatomy education during a good medical education and their self-efficacy beliefs related to that shall be detected. The objective of our study is to meet the self-efficacy beliefs related to anatomy education of the Medical Faculty students who have just acquainted with the Anatomy in the 1st term and the students who have completed their Anatomy education in the 2nd term.

MATERIAL - METHOD

207 students from the 1st term and 276 students from the 2nd term who attend to Kocaeli University Medical Faculty were included in our study. The general information has been prepared by adapting from the questionnaire improved by Çolak S. (2013). In this questionnaire, the ages and genders of students, the places they dwell during their education and the places they have come from were questioned.

The Anatomy Self-Efficacy Belief scale (ASEB) was prepared by adapting the scale constituted by Akkoyunlu et al., (2005) and Çolak S. (2003) to the Anatomy and by preparing 15-article propositions. The answers were constituted by quintet Likert-type scaling and the degree of agree of the individuals to each instruction were classified as 1) “I strongly disagree”, 2) “I disagree”, 3) “I am not sure”, 4) “I agree” and 5) “I completely agree” (Bozdağın and Öztürk, 2008).

The statistical analysis of the data obtained was made with the SPSS for Windows 13.0 package program.

RESULTS

The percentage of the 1st term students who contributed to the study is 127 male (46%) and 149 female (54%) and the percentage of the 2nd term students is 94 male (45,4%) and 113 female (54,6%) (Table 1).

When we divided the students according to the geographical regions where they had come from, the 1st term students were divided as; 152 from the Marmara Region, 41 from the Black Sea Region, 18 from the East Anatolia Region, 15 from the South-East Anatolia Region, 14 from the Aegean Region, 13 from the Mediterranean Region, 12 from the Inner Anatolia Region and 10 from abroad. And for the 2nd term students; 115 from the Marmara Region, 32 from the Black Sea Region, 14 from the South-East Anatolia Region, 13 from the Aegean and East Anatolia Regions, 8 from the Mediterranean and Inner Anatolia Regions and 4 from abroad (Table 1).

Table 1: The demographic properties of the First and the Second Term students in the School of Medicine

	GENDER		The regions they have come from								
	Male	Female	Mediterranean	East Anatolia	Aegea	South East Anatolia	Central Anatolia	Black Sea	Marmara	Foreign Country	Total
The 1st Term	127 (%46)	149 (%54)	13 (4,7)	18 (6,5)	14 (5,1)	15 (5,4)	12 (4,3)	41 (14,9)	152 (55,1)	10 (3,6)	276
The 2nd Term	94 (%45.4)	113 (%54.6)	8 (3,9)	13 (6,3)	13 (6,3)	14 (6,8)	8 (3,9)	32 (15,5)	115 (55,6)	4 (1,9)	207

When the ASEB levels of the 1st term and 2nd term students are compared with according to genders, a significant difference was found between genders; for the 1st term students, it is $46,89 \pm 5,02$ females and $45,10 \pm 5,56$ males ($p < 0,05$). It was seen that the self-efficacy belief levels of females is higher when compared with the males. And for the 2nd term, no significant difference was found; $88,24 \pm 10,96$ females and $87,60 \pm 10,02$ males ($p > 0,05$).

When the statistical results of our study are looked upon, the ASEB level averages of especially the 1st term students of the medical faculty was found as $46,07 \pm 5,3$; and the ASEB level averages of the 2nd year students was found as $87,95 \pm 10,5$ and a significant difference was found between them ($p < 0,05$) (Table 2).

Table 2: The Comparison of Self-Efficacy Beliefs of Anatomy Between the First and the Second Class Students in Medical School

	Mean±Standard Deviation	P Value
The 1st Term	46.07 ± 5.3	0.05
The 2nd Term	87.95 ± 10.5	

DISCUSSION

Many studies have been made on education regarding SEB (Self-Efficacy Belief) levels (Yusuf, 2011; Zimmerman, 2000; Çolak, 2013). According to Albert Bandura, self-efficacy is one of the basic concepts of the theory of social learning (Bozdoğan, 2008). According to Bandura (1977), self-efficacy is defined as the individual's capability to cope with the problems and issues which facing throughout of his life. The way how an individual implements the necessary activities as good as possible when he faces a problem during either his life or his education shows the level of the self-efficacy of that individual about that matter. That is to say, the self-efficacy level means the capability of an individual to realize a work and to succeed (Çolak, 2013). The self-efficacy belief level which has been improved in the field of Sociology can be implemented in very different fields and in many disciplines, education being in the first place (Akkoyunlu, 2003; Lev, 1997; Karsten, 1998). In the field of education, when the studies intended for the self-efficacy belief levels are looked upon; it is seen that Yaman S., on Science Teachers; Bozdoğan A., on Geography Education; Çolak S., on Computer Education; Yusuf M., on Academic Education have carried out studies. Even though no study in medical education on self-efficacy about Anatomy is encountered, we have encountered studies searching the self-efficacy situations intended for Anatomy lessons but for students in departments other than medicine (Lök, 2009). Lök S., in the studies he made, measured the self-efficacy situations aimed for the Anatomy lessons of the students who attended to Physical Education Teaching and Games Master Teaching and Nursing departments and who had taken Anatomy lessons and at the end of the study, he found that the self-efficacy belief levels of the students in the Nursing department was higher than the self-efficacy belief levels of the students in the Physical Education Teaching and the Games Master Teaching departments. He made a connection so that, the reason for the self-efficacy perception of the students in the Nursing department which was higher according to their practices is because these perceptions shall be used in every field of their careers. And this is connected to that the Anatomy

knowledge shall be used more in the Nursing profession than in the Physical Education Teaching and the Games Master Teaching professions.

And, we have found in our study a result that in Anatomy education, the ASEB levels of the 1st term students who have become acquainted with Anatomy lessons for the first time is lower than the ASEB levels of the 2nd term students in the Medical Faculty who have already completed the Anatomy education and there is a significant difference between the two groups. And it has been found that, in relation with the education we give, whether theoretical or practical, the Anatomy education increases the self-efficacy levels of the students intended for the Anatomy knowledge and consequently, from the Anatomy knowledge point of view, they feel themselves more secured in the upper classes in school and in professional fields. When the results of our study are looked upon, we have detected that there is a significant difference between the genders and the ASEB levels of the 1st term girls and boys ($p < 0.05$) but we concluded that there is not any significant difference between the genders and the ASEB levels of the 2nd term girls and boys ($p > 0.05$). And as the reason for this, we think that, during the Anatomy education we give, the males in the 1st term whose ASEB levels were lower, with the medical education, they have closed this gap and during this period of time, they have taken a better Anatomy education. And the studies carried out have also showed that the self-efficacy perception is an important phenomenon to lay emphasis on in any occupational group (Lök, 2009; Koray, 2003). The individuals whose self-efficacy perceptions related to any situation is at the highest level spend more effort to succeed in the duty they have undertaken and to be better from the professional point of view. And this adds to the capacity to cope of the individuals (Dorman, 2001; Lök, 2009).

CONCLUSIONS

In our study, we think that the Anatomy knowledge which shall be used either in the clinical fields in upper classes or during professions as a physician after their graduation by the students whose self-efficacy levels are high shall add to those individuals. Already, the results of our study have shown that a 1-year Anatomy education has elevated the self-efficacy belief levels intended for the Anatomy education of Medical Faculty students.

References

- Akkoyunlu, B., Orhan F. (2003). *The relationship between the Self-Efficacy Beliefs and the demographic characteristic of the students who are in the Computer and Teaching Technologies Education Deptat.* Turk. Online J. Educ. Technol. 2 (3), 86-93.
- Akkoyunlu, B., Orhan, F., Umay, A. (2005). *A Study on Developing Teacher Self Efficacy Scale For Computer Teachers.* Hacettepe University J. Educ. 29, 1-2.
- Bandura, A. (1977). *Self-efficacy: Toward a unifying theory of behaviour change.* Psychol. Rev. 84, 191-215.
- Bozdoğan, A.E., Öztürk, Ç. (2008). *Improving Of Self-Efficacy Scale Of Geographyc Coneptions Embedded Within 'Science' Course* Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education 2(2), 66-81.
- Çolak, S. (2013). *The Relationship Among Computer Self-Efficacy Scores, Demographic Charecteristics And Grades in Computer Courses Of Students at The School of Physical Education And Sports.* Educational Research And Reviews. 8(8), 374-377.
- Dorman, J. P. (2001). *Associations Between Classroom Environment And Academic Efficacy.* Learning Environments Research. 4, 243-257.
- Karsten, R., Roth, M.R. (1998). *The Relationship Of Computer Experience And Computer Self-Efficacy to Performance in Introductory Computer Literacy Courses.* J. Res. Technol. Educ. 31(1), 14-24.
- Koray, Ö. (2003). *Yaratıcı Düşünceye Dayalı Fen Öğretiminin Öğretmen Adaylarının Öz Yeterlik, Yaratıcılık ve Problem Çözme Düzeylerine Etkisi.* The thesis of an unpublished doctorate, Gazi University, The Institute of Educational Sciences, Ankara.
- Lev, E.L. (1997). *Bandura's Theory Of Self-Efficacy: Applications to Oncology.* Sch. Inq. Nurs. Pract. 11(1), 21-42.
- Lök, S., Taşgın, Ö., Lök, N., Yıldız, M. (2009). *Comparing The Karamanoglu Mehmet University Students' Self - Ability For Anatomy Lesson In Diffrent Branches* Selçuk Üni. Sosyal Bil. Ens. Dergisi. 21, 339-345.
- Moore, K. & Dalley, A.F. (2007). *Kliniğe Yönelik Anatomi.* The translation editor: Şahinoğlu K. Ankara: Nobel Tıp Kitapevleri.
- Yaman, S., Koray, Ö.C., Altunçekiç, A. (2004). *Investigation of Prospective Science Teachers' Academic Self-Efficiency Perceptions* The Journal of Turkish Education Sciences 2(3).
- Yıldırım, M. (2013). *Resimli Sistemantik İnsan Anatomisi.* Ankara: Nobel Tıp Kitapevleri.
- Yusuf, M. (2011). *The Impact Of Self-Efficacy, Achievement Motivation, And Self-Regulated Learning Strategies On Students' Academic Achievement.* Procedia Social and Behavioral Sciences. 15, 2623-2626.
- Zimmerman, B.J. (2000). *Self-Efficacy: An Essential Motive to Learn.* Contemporary Educational Psychology. 25, 82-91.

The Correlation Between Leadership, Culture, And Student Achievement

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ABSTRACT

Educational institutions across the nation are being unsuccessful at meeting academic goals set by the states and preparing students to be college and career ready. Many schools around the globe are suffering from a shortage of experienced and competent school leaders that can bring about positive change and increase student achievement. Thus, the objective of this study was to determine the correlation between leadership practices, school culture, and student achievement in an effort to build the capacity of principal leaders. A correlational design was used to determine the relationship between principal leadership practices, culture, and achievement in elementary, middle, and high schools. A total of 216 teachers in 31 schools completed the Leadership Practices Inventory and School Culture Survey. A significant correlation was found between (a) leadership practices and school culture and (b) school culture and student achievement. No relationship was established between leadership practices and school culture. The results implied that school leaders who use transformational leadership practices indirectly impact student achievement through creating a positive school culture. It is recommended that principal preparation programs revamp leadership curriculum to develop leaders who can create positive school cultures and manage reform efforts.

Keywords: Education, culture

INTRODUCTION

School leaders are confronted with a number of challenges on a daily basis. For instance, principals contend with staff issues, school improvement, structural changes, instructional matters, budgetary cuts, and parent concerns (Devos & Bouckennooghe, 2009; Johnson, 2008; Watkins & Moak, 2011). Furthermore, educational leaders are faced with improving the academic achievement of all students (Hildebrand, 2012; Hughes & Jones, 2010-2011). The accountability systems of the states and the nation require principals to lead organizations to high levels of academic achievement (Huff, Brockmeier, Leech, Martin, Pate, & Siegrist, 2011).

The No Child Left Behind (NCLB) Act was instituted to increase achievement for all students. However, educational institutions have been unsuccessful at meeting the academic goals set by the states (Dillon, 2010; Huff et al., 2011; Pepper, 2010). According to the National Assessment of Educational Progress, 62% of fourth and eighth grade students in American schools scored at the basic level on math assessments and 65% of fourth and eighth grade students scored at the basic level on reading assessments (Hanushek, Peterson, & Woessman, 2011; Peterson, Woessman, Hanushek, & Lastra-Anadon, 2011). Thus, it is vital that school organizations and leadership programs find approaches to raise achievement for all students.

One method to increase academic achievement is to improve school leadership. Leithwood, Harris, and Hopkins (2008) proposed that principals have a significant impact on student achievement. Successful leaders plan for systemic change and facilitate effective teaching and learning in the didactic organization (Hallinger, 2011; Maulding, Townsend, Leonard, Sparkman, Styron, & Styron, 2010). Transformational leaders create positive and healthy cultures, which motivates staff and improves teacher performance (Crum, Whitney, & Myran, 2009; Tajasom, 2011). Numerous researchers have indicated that effective principal leaders are fundamental to the success of educational institutions (Hallinger, 2011; Hallinger & Heck, 2010; Knab, 2009; Leithwood & Sun, 2012). However, there is a substantial shortage of qualified and competent educational leaders in schools throughout the nation (Maulding et al., 2010). In addition, principal preparation and certification programs are not preparing school leaders with the skills necessary to improve teaching and student learning (Huff et al., 2011). Thus, additional research is required to advance the leadership practices of principals.

Another approach to improve student achievement is through the creation of a positive school culture. The principal plays a crucial role in the development of a healthy culture (Lindahl, 2011). The culture of an organization impacts every aspect of the schooling process, especially student achievement (Kythreotis, Pashiardis, & Kyriakides, 2010; MacNeil, Prater, & Busch, 2009; Sahin, 2011). Researchers have indicated that school leadership and culture influence academic achievement (Hallinger & Heck, 2010; Kythreotis et al. 2010; Leithwood & Sun, 2012; MacNeil et al., 2010; Sahin, 2011). However, the quantity of impact and the individual leadership and cultural practices required to increase student achievement is debatable (Gumuseli & Eryilmaz, 2011; Kythreotis et al., 2010). Thus, a deeper understanding of the relationship between leadership, culture, and student achievement is needed to assist principal certification programs in preparing school leaders to make positive change in the organization and improve student learning.

PURPOSE

The purpose of this investigation was to determine the relationship between leadership practices, school culture, and student achievement. Another objective of this study was to establish the leadership and cultural practices required to improve student achievement. The following questions guided the study:

RQ1. What is the relationship between leadership practices and school culture?

RQ2. What is the relationship between school culture and student achievement?

RQ3. What is the relationship between leadership practices and student achievement?

METHODOLOGY

Research Design

The study was quantitative in nature and was conducted with the use of an online survey. A correlational design was utilized to conduct the study. Regression techniques were appropriate for this investigation because the parametric test is functional at establishing correlations among variables (Yan, 2009). Multivariate multiple regression was employed to determine the association between the leadership practices and school culture variables. Multiple regression was utilized to establish the relationship among (a) leadership practices with student achievement and (b) school culture with student achievement.

Participants

An a priori power analysis was conducted to determine an appropriate sample size for the study. The sample size was calculated by assuming a power of 0.80, an effect size of 0.15, an alpha level of .05, and six predictors (Andersen, 2008; Coladarci et al., 2011; Yan, 2009). The required sample size was 98 subjects. The minimal sample size was met, since a total of 216 teachers participated in the study.

The participants were chosen with the use of a simple random sampling method. Various performing schools were chosen to participate in the study. A total of 310 participants from 31 elementary, middle, and high schools in Southwest Mississippi schools were selected to participate in the study. Two-hundred and sixteen participants successfully completed the online survey, which resulted in a 69.7% response rate. Approximately 79% of the teachers that participated in the study were Caucasian and 88% of the subjects were female.

Variables

The variables for this study included leadership practices, school culture, and student achievement. Transformational leadership was conceptualized in this study using the five leadership practices as identified by Kouzes and Posner (2007). The five leadership variables included modeling the way, inspiring a shared vision, challenging the process, enabling others to act, and encouraging the heart. School culture was conceptualized with the use of the six cultural factors as identified by Gruenert and Valentine (1998). The six cultural factors are collaborative leadership, teacher collaboration, professional development, collegial support, unity of purpose, and learning partnership. Leadership practices and school culture variables were independent variables and student achievement was the dependent variable. Student achievement data for the 2011-2012 school year was obtained from the Mississippi Department of Education website.

Instrumentation

The instrument used to measure leadership practices was the Leadership Practices Inventory (LPI) by Kouzes and Posner (2003). The LPI measures the following five transformational leadership practices: modeling the way, inspiring a shared vision, challenging the process, enabling others to act, and encouraging the heart. The LPI consists of a total of 30 questions and is based on a 10-point Likert-scale. A maximum score of 60 and a minimum score of 6 can be obtained for each leadership practice. High scores indicate that the leader employs the leadership practice regularly, while low scores signify that the principal rarely utilizes the leadership practice. The internal reliability of the instrument ranges from 0.85 to 0.92.

A definition for each of the leadership practices is provided below:

Modeling the way. Modeling the way is the extent to which the transformational leader sets the example for others to follow (Kouzes & Posner, 2007).

Inspiring a shared vision. Inspiring a shared vision is the degree to which the leader creates a shared vision with the stakeholders and nurtures a promise to fulfill the goals of the institution (Kouzes & Posner, 2007).

Challenging the process. Challenging the process is the extent to which the leader takes risks to make positive change to the organization (Kouzes & Posner, 2007).

Enabling others to act. Enabling others to act is the degree to which the principal empowers the staff to become leaders and includes the faculty in the decision-making process (Kouzes & Posner, 2007).

Encouraging the heart. Encouraging the heart is the extent to which the school leader encourages and recognizes the staff for achieving the goals of the organization (Kouzes & Posner, 2007).

The instrument used to measure the cultural factors was the School Culture Survey (SCS) by Gruenert and Valentine (1998). The SCS assesses the following six school culture factors: collaborative leadership, teacher collaboration, professional development, collegial support, unity of purpose, and learning partnership. The SCS consists of a total of 35 questions and is based on a 5-point Likert-scale. High scores signify that the principal utilizes the cultural practice frequently, while low scores indicate that the leader seldom employs the cultural practice. The internal reliability of the instrument is 0.96.

A definition for each of the school cultural variables is provided below:

Collaborative leadership. Collaborative leadership is the degree to which the principal develops mutual affiliations with the faculty (Gruenert & Valentine, 1998; Gumuseli & Eryilmaz, 2011).

Teacher collaboration. Teacher collaboration is the extent to which the teachers work together as a group to improve instructional practices and meet organizational goals (Gruenert & Valentine, 1998; Gumuseli & Eryilmaz, 2011).

Professional development. Professional development is the degree to which the educational staff engages in seminars and trainings to stay current with educational issues and improve instructional practices (Gruenert & Valentine, 1998; Gumuseli & Eryilmaz, 2011).

Collegial support. Collegial support is the extent to which teachers trust and work together to achieve the objectives of the school (Gruenert & Valentine, 1998; Gumuseli & Eryilmaz, 2011).

Unity of purpose. Unity of purpose is the degree to which stakeholders work towards the common mission of the school (Gruenert & Valentine, 1998; Gumuseli & Eryilmaz, 2011).

Learning partnership. Learning partnership is the extent to which the principal, teachers, and parents work together to improve the performance and achievement of the child (Gruenert & Valentine, 1998; Gumuseli & Eryilmaz, 2011).

Data Collection

First, permission from the superintendents, principals, and Northcentral University was obtained before collecting data. Second, a random sample of participants was attained with the use of a simple random sampling method. Third, the teachers were invited to participate in the study. Fourth, the online survey was sent to the participants through email. Data was collected for approximately one month.

Data Analysis and Assumptions

The data was analyzed with the use of inferential statistics. Multivariate multiple regression was employed to determine the relationship between leadership practices and school culture. This statistical test was appropriate for measuring the associations among multiple predictor and multiple dependent variables. Multiple regression was utilized to establish the correlation between leadership practices and student achievement and school culture.

The assumption of normality, homoscedasticity, linearity, and multicollinearity were assessed before conducting the regression analyses. The assumption of normality, homoscedasticity, and linearity were evaluated through visual inspections of histograms and scatterplots. Each of the assumptions was met. The assumption of multicollinearity was assessed by calculating variance inflation factors (VIF) for each of the leadership practices and school culture variables. The VIF values were within the acceptable range, which indicated that the assumption of multicollinearity was satisfied.

RESULTS

The purpose of this study was to determine the relationship between leadership practices, school culture, and student achievement. The first question was concerned with determining the relationship between leadership

practices and school culture. A multivariate multiple regression analysis was employed to answer Research Question 1. The results of the analysis between leadership practices and school culture are presented in Table 1.

Table 1
Multivariate Test of the Contribution of Independent Variables to the Full Model

Effect	Pillai's Trace ^a	F	p
Intercept	.586	41.17	<.001
Modeling the Way	.053	1.91	.081
Inspiring a Shared Vision	.066	2.41	.029
Challenging the Process	.077	2.84	.011
Enabling Others to Act	.122	4.74	<.001
Encouraging the Heart	.059	2.15	.050

Note. ^aHypothesis df=6 and Error df=205. Collaborative Leadership: (F(5, 210)=30.12, $p<.001$, $R^2=.363$), Teacher Collaboration: (F(5, 210)=15.10, $p<.001$, $R^2=.223$), Professional Development: (F(5, 210)=19.95, $p<.001$, $R^2=.274$), Unity of Purpose: (F(5, 210)=20.99, $p<.001$, $R^2=.285$), Collegial Support: (F(5, 210)=16.46, $p<.001$, $R^2=.238$), Learning Partnership: (F(5, 210)=9.50, $p<.001$, $R^2=.153$).

Pillai's Trace was the multivariate statistic employed to establish the leadership practices that contributed to the regression model. Inspiring a shared vision, challenging the process, enabling others to act, and encouraging the heart were the four leadership practices that contributed to the model at the .05 significance level. The regression model with the four predictor variables accounted for 36% of the variation in collaborative leadership, 22% of the variance in teacher collaboration, 29% of the variation in unity of purpose, 27% of the variance in professional development, 24% of the variance in collegial support, and 15% of the variation in learning partnership. Furthermore, the regression analysis revealed that inspiring a shared vision and enabling others to act were significant predictors of school culture. Inspiring a shared vision was a significant predictor of collaborative leadership ($p=.003$), unity of purpose ($p=.029$), and professional development ($p=.013$). Enabling others to act was a significant predictor of teacher collaboration ($p=.041$). The findings indicated that a significant relationship existed between leadership practices and school culture.

The objective of Research Question 2 was to determine the correlation between school culture and student achievement. A multiple regression analysis was conducted to answer Research Question 2. Furthermore, multiple regression was employed to establish the relationship between the six cultural factors and student achievement. The results of the regression analysis are presented in Table 2. The analysis revealed a significant correlation between school culture and student achievement, (F(6,209)=3.294, $p=.004$, $R^2=.086$). The full model accounted for approximately 9% of the variation in student achievement. As can be seen in Table 2, learning partnership was the only significant predictor of student achievement ($\beta=.223$, $p=.027$). The results of the regression analysis signified that a statistically significant association existed between school culture, especially learning partnership, and student achievement.

The objective of Research Question 3 was to establish the association between leadership practices and student achievement. A multiple regression analysis was conducted to answer this research question and to determine the relationship between the five leadership practices and student achievement. The results of the regression analysis are presented in Table 3. The regression analysis indicated that no significant correlation existed between the leadership practices and student achievement, (F(5,210)=2.176, $p=.058$, $R^2=.049$). The full model revealed that the five leadership practices only accounted for 4.9% of the variation in student achievement. As can be seen in Table 3, no leadership practice was a significant predictor of student achievement. The findings of the multiple regression analysis signified that no relationship existed between leadership practices and student achievement.

Table 2
Multiple Regression Analysis of School Culture and Student Achievement

Variables	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>
Collaborative Leadership	.145	3.163	.006	.046	.963
Teacher Collaboration	-3.017	2.879	-.133	-1.048	.296
Professional Development	-.579	3.826	-.022	-.151	.880
Collegial Support	-1.218	2.710	-.051	-.449	.654
Unity of Purpose	6.202	3.626	.232	1.710	.089
Learning Partnership	4.683	2.099	.223	2.231	.027

Note. N=216. Full Model: $F(6, 209) = 3.294$, $p=.004$, $R^2 = .086$; *SE*=Standard Error.

Table 3
Multiple Regression Analysis of Leadership Practices and Student Achievement

Variables	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>
Modeling the Way	-4.547	2.395	-.430	-1.899	.059
Inspiring a Shared Vision	.957	2.296	.086	.417	.677
Challenging the Process	1.982	2.534	.185	.782	.435
Enabling Others to Act		1.804	1.816	.158	.993
.322					
Encouraging the Heart	1.933	1.848	.194	1.046	.297

Note. N=216. Full Model: $F(5, 210) = 2.176$, $p=.058$, $R^2 = .049$, *SE*=Standard Error

DISCUSSION

The relationship between leadership practices, school culture, and student achievement was investigated in this study. Kouzes and Posner's transformational leadership model and Gruenert and Valentine's cultural model was utilized to conceptualize the leadership practices and school culture variables. The findings are presented as follows: a) correlation of leadership practices and school culture, b) correlation of school culture and student achievement, and c) correlation of leadership practices and student achievement. The implications of the findings and recommendations for practice will also be presented in this section.

Correlation of Leadership Practices and School Culture

The results of this research indicated that a strong correlation existed between leadership practices and school culture in Southwest Mississippi. The findings of this study are supported by other researchers (Cemaloglu, 2011; Engels, Hotton, Devos, Bouckennooghe, & Aelterman, 2008; Kythreotis et al., 2010; Leithwood & Sun, 2012; MacNeil et al., 2009). This research and other studies have demonstrated that the principal leader plays a significant role in the development of a positive school culture (Hallinger, 2011, Sahin, 2011). A healthy and positive organizational culture improves the morale and motivation of the teaching staff in the school organization. Thus, it is imperative that school leaders improve the school culture in order to improve teacher performance and increase student achievement (Hallinger, 2011; MacNeil et al., 2009).

The findings of this study implied that school leaders who effectively utilize the Kouzes and Posner's leadership practices have a healthier and more positive school culture. However, it was established that inspiring a shared vision and enabling others to act were the only significant predictors of school culture. No literature was discovered that examined the association among the five transformational leadership practices and the six cultural elements of school culture. The results of this study are similar to other studies conducted in the educational arena (Engels et al., 2008; Kythreotis et al., 2010; Sahin, 2011). One research team determined that creating a vision and building the competence of teachers were leadership practices that significantly impacted school culture (Leithwood & Sun, 2012).

Correlation of School Culture and Student Achievement

The findings of the study suggested that school culture significantly impacted student achievement. Learning partnership was the cultural factor that was a significant predictor of academic achievement in Southwest Mississippi Schools. The results of this research are supported by other correlational studies involving school culture and achievement (Demirtas, 2010; MacNeil et al., 2009; Ohlson, 2009). Gruenert (2005) discovered that

learning partnership and unity of purpose were the cultural factors that correlated positively with academic achievement. Another researcher found that collaborative leadership and unity of purpose were significant determinants of student attainment (Demirtas, 2010). Based on the results of this study and the literature, it is recommended that school leaders improve their cultural practices, especially learning partnership, in order to increase academic achievement.

Correlation of Leadership Practices and Student Achievement

The results of this study indicated that no significant correlation existed among transformational leadership practices and student achievement. This research is supported by other educational scholars (Gieselmann, 2009; Siegrist et al., 2009). One research team found that the leadership practices of principal leaders had no impact on academic achievement (Siegrist et al., 2009). Another researcher established that principal leadership did not forecast academic achievement on state tests (Gieselmann, 2009).

It was concluded from this study that the leadership practices of school leaders, as identified by Kouzes and Posner, do not directly influence academic achievement. However, the findings suggested that principal leaders directly and positively impacted school culture. It is recommended that principals employ Kouzes and Posner's five transformational leadership practices in order to positively influence school culture. Furthermore, this study advocated that school leaders improve academic achievement indirectly through creating a positive school culture.

Conclusion

Multiple regression analysis was used in this study to ascertain the correlation among leadership practices, school culture, and student achievement. A significant relationship was established among the five leadership practices and six elements of school culture. Furthermore, a correlation was found to exist between school culture and student achievement. The results of this study revealed that no significant association existed between transformational leadership and academic achievement. The findings of this study implied that the impact of leadership practices is mediated through school culture. Therefore, it is imperative that school leaders work diligently to create a healthy school culture.

It is recommended that universities and principal preparation programs utilize the results of this study and other similar studies to improve their leadership programs. It is recommended that certification programs revamp their curriculum to better prepare principal candidates for the leadership role. Leadership preparation programs need to provide students with internships that are suitable to prospective principal candidates. In addition, school districts are advised to provide mentors to new and struggling principals in order to bring positive change to didactic institutions and increase student achievement.

References

- Andersen, R. (2008). *Modern methods for robust regression*. Thousand Oaks, CA: Sage Publications.
- Cemaloglu, N. (2011). Primary principals' leadership styles, school organizational health, and workplace bullying. *Journal of Educational Administration*, 49(5), 495-512. doi: 10.1108/09578231111159511.
- Coladarci, T., Cobb, C., Minium, E., & Clark, R. (2011). *Fundamentals of statistical reasoning in education* (3rd ed.). Hoboken, NJ: John Wiley & Sons.
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Demirtas, Z. (2010). The relationship between school culture and student achievement. *Education and Science*, 35(158), 3-13.
- Devos, G., & Bouckennooghe, D. (2009). An exploratory study on principals' conceptions about their role as school leaders. *Leadership and Policy in Schools*, 8, 173-196. doi: 10.1080/15700760902737196
- Dillon, S. (2010). Obama to seek sweeping change in no child law. *The New York Times*, p. A1. Retrieved from <http://www.nytimes.com/2010/02/01/education/01child.html?ref=nochildleftbehindact>
- Engels, N., Hotton, G., Devos, G., Bouckennooghe, D., & Aelterman, A. (2008). Principals in schools with a positive school culture. *Educational Studies*, 34(3), 159-174. doi: 10.1080/03055690701811263
- Gieselmann, S. (2009). Principals and school factors that impact elementary school student achievement. *Mid-Western Educational Researcher*, 22(2), 16-22.
- Gruenert, S. (2005). Correlations of collaborative school cultures with student achievement. *NASSP Bulletin*, 89(645), 43-55.
- Gruenert, S., & Valentine, J. (1998). *School culture survey*. Retrieved from <http://www.mllc.org>
- Gumuseli, A., & Eryilmaz, A. (2011). The measurement of collaborative school culture on Turkish schools. *New Horizons in Education*, 59(2), 13-26.
- Hallinger, P. (2011). Leadership for learning: Lessons from 40 years of empirical research. *Journal of Educational Administration*, 49(2), 125-142. doi: 10.1108/09578231111116699

- Hanushek, E., Peterson, P., & Woessman, L. (2011). Teaching math to the talented. *Education Next*, 11(1), 11-18.
- Heck, R., & Hallinger, P. (2010). Collaborative leadership effects on school improvement. *Elementary School Journal*, 111(2), 226-252.
- Hildebrand, J. (2012). New ways to teach: Focused national standards are changing LI classrooms. *Newsday*, p. A02.
- Huff, T., Brockmeier, L., Leech, D., Martin, E., Pate, J., & Siegrist, G. (2011). Principal and school-level effects on student achievement. *National Teacher Education Journal*, 4(2), 67-76.
- Hughes, C., & Jones, D. (2010-2011). A relationship among public school leadership, ethics, and student achievement. *National Forum of Educational Administration and Supervision Journal*, 27(2), 50-73.
- Johnson, J. (2008). The principal's priority 1. *Educational Leadership*, 66(1), 72-76.
- Knab, D. (2009). A comparison of the leadership practices of principals of high schools that work: Schools as measured by the leadership practices inventory. *Academic Leadership Journal*, 7(2), 4.
- Kouzes, J. M., & Posner, B. Z. (2007). *The leadership challenge* (4th ed.). San Francisco, CA: Jossey-Bass.
- Kouzes, J., & Posner, B. (2003). *The leadership practices inventory (LPI): Self-and observer instruments* (3rd ed.). San Francisco, CA: Jossey-Bass.
- Kythreotis, A., Pashiardis, P., & Kyriakides, L. (2010). The influence of school leadership styles and culture on students' achievement in Cyprus primary schools. *Journal of Educational Administration*, 48(2), 218-240. doi: 10.1108/09578231011027860
- Leithwood, K., Harris, A., & Hopkins, D. (2008). Seven strong claims about successful school leadership. *School Leadership and Management*, 28(1), 27-42.
- Leithwood, K., & Sun, J. (2012). The nature and effects of transformational school leadership: A meta-analytic review of unpublished research. *Educational Administration Quarterly*, 48(3), 387-423. doi: 10.1177/0013161X11436268
- Lindahl, R. (2011). The crucial role of assessing the school's climate in planning school improvement. *Educational Planning*, 20(1), 16-30.
- MacNeil, A. J., Prater, D. L., & Busch, S. (2009). The effects of school culture and climate on student achievement. *International Journal of Leadership in Education*, 12(1), 73-84. doi: 10.1080/13603120701576241
- Maulding, W., Townsend, A., Leonard, E., Sparkman, L., Styron, J., & Styron, R. (2010). The relationship between emotional intelligence of principals and student performance in Mississippi public schools. *Academic Leadership*, 8(4).
- Ohlson, M. (2009). Examining instructional leadership: A study of school culture and teacher quality characteristics influencing student outcomes. *Florida Journal of Educational Administration and Policy*, 2(2), 102-113.
- Pepper, K. (2010). Effective principals skillfully balance leadership styles to facilitate student success: A focus for the reauthorization of ESEA. *Planning and Changing*, 41(1/2), 42-56.
- Peterson, P., Woessman, L., Hanushek, E., & Lastra-Anadon, C. (2011). Are U. S. students ready to compete: The latest on each state's international standing. *Education Next*, 11(4), 50-59.
- Sahin, S. (2011). Instructional leadership in Turkey and the United States: Teachers' perspectives. *Problems of Education in the 21st Century*, 34, 122-137.
- Siegrist, G., Weeks, W., Pate, J., & Monetti, D. (2009). Principals' experience, educational level, and leadership practices as predictors of Georgia high school graduation test results. *Journal of Philosophy and History of Education*, 59(1), 174-179.
- Tajasom, A. (2011). Principals' leadership style and school climate: Teachers' perspective from Malaysia. *International Journal of Leadership in Public Services*, 7(4), 314-333.
- Watkins, P., & Moak, J. (2011). Elementary school principal: Dispositional, gender, and environmental predictors of student achievement success for the 21st century. *National Forum of Applied Educational Research*, 24(1/2), 37-45.
- Yan, X. (2009). *Linear regression analysis: Theory and computing*. Retrieved from <http://site.ebrary.com/lib/ncent/Doc?id=10361753&ppg=22>

The Effect Of 6-Stage Evaluation Questions And Supportive Activities Applied At The End Of Drama Plays On Learning Emotion Concepts In 60-72 Month-Old Children

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SUMMARY

The purpose of this study is to prove the effect of 6-stage evaluation questions and supportive activities applied at the end of drama plays on learning emotion concepts by 60-72 month-old children. The study group was divided to three with 14 children in Experimental1, 13 children in Experimental2 and 14 children in control groups. The data collection tool used in the study was Emotion Concepts subscale of Concept Development Scale. A program was developed by the researchers to teach emotion concepts of happy, sad, angry, confused, and afraid. The program was applied as activities of 45-minute duration once a week for 8 weeks. Results of the study demonstrated that applying evaluation and supportive activities through 6-stage evaluation/discussion questions and supportive activities as suggested by Önder (1995) following drama plays ensures emotion concepts are learned in the ultimate way compared to other approaches (using drama only or not applying drama at all).

INTRODUCTION

Preschool is the most significant period of life. A comprehensive education policy must be applied during this period to support child development in every dimension. Educative drama applications that can support children's physical, cognitive, linguistic, social, and emotional development simultaneously, that can present a holistic education opportunity are suggested strongly to have an important place in preschool education.

According to Önder (2003, p.49); bringing up healthy, happy, empathizing, sensitive, creative, problem solving, confident, assertive, free, innovator individuals who can establish positive and effective communication with people around them are amongst general purposes of preschool education. These purposes can be achieved with educational drama applications. According to Önder (2007) participating in drama plays is not enough on its own for children to conceptualize and mentally acquire knowledge. Acting drama plays only does not guarantee learning. Making physical movements is only the beginning of gaining concepts kinesthetically through the body. There is need for an evaluation stage where the movements of body are named, coded, comprehended, differentiated or generalized (Önder, 2007). Önder's argument was also emphasized by many educative drama experts (Fullford et. al., 2011; Heinig, 1981; O'Neill and Lambert, 1988; Siks, 1983). For instance according to Siks (1983), evaluations following each drama play give students the chance to make generalizations about their own developments and reflect upon their experiences. Fullford et. al. (2001) noted that educative drama activity cannot reach its education targets without discussion session. The six-stage evaluation based on asking questions that Önder proposed (2007) is practiced by directing six questions at various levels about drama play to children following drama play.

These questions are as follows:

1. Envisioning: Children are asked to envision the drama play with their eyes closed for 30-40 seconds.
2. Definitional Level: Children are asked to describe the drama play.
3. Emotional Level: At this level children are asked to talk about how they felt while acting in the drama play or guess emotions of how others in the play.
4. Cognitive Level: Information oriented questions about concepts, issues or skills dealt with at drama play are asked.
5. Experience Level: Children are asked to find and describe examples of events expressed in drama play from their lives.
6. Developmental Level: At this question level children are asked questions based on concepts and relations not discussed in the play that would stimulate their creativity and encourage them to think such as how the play could have ended differently.

According to Ülgen (2001), concept learning is the key to other learning and "basically, concepts exist with people and the experiences they gain with their emotions, thoughts, and actions. These concepts that people

produce are a kind of information form that enables coalescing with and understanding the world, ensures communication amongst people and finally establishes the basis for developing principles.

Educative drama play and evaluation session that follows are amongst techniques and methods that can be used to teach concepts (Önder, 2007). According to Önder (2007), application of one or more of other teaching methods (such as painting, cutting and pasting, playing finger plays or with play dough, singing children's songs, working on study page) in line with the concept or issue discussed in the drama after asking 6-stage evaluation questions following drama play can also contribute to learning of the concept or issue in question. This study aims to underline evaluation studies conducted following drama plays and their supportive impact. Especially examining effectiveness of applying 6-stage evaluation session of educational drama play method together with supportive studies while teaching basic emotion concepts (happy, sad, angry, confused, afraid) is determined as an area that has not been explored in previous studies.

With this in mind, purpose of this study is to determine whether children who participated in 6-stage evaluation and support studies following drama play in educational drama applications perform better in learning emotion concepts (happy, sad, angry, confused, afraid) compared to children who participated in drama play but not in evaluation and support studies and to children who never received an education based on drama play.

In order to achieve the said purpose, the study tried to find the answers of the following questions:

In learning emotion concepts;

1. Are children in Experimental1 group who participated in an education program based on evaluation and support activities following drama play more successful than children in Control group who did not participate in drama play or following activities?
2. Are children in Experimental2 group who participated in an education program that did not include evaluation and support activities following drama play more successful than children in Control group who did not participate in drama play or following activities?
3. Are children in Experimental1 group who participated in an education program based on evaluation and support activities following drama play more successful than children in Experimental2 group who participated in an education program that was based on drama play not followed by evaluation and support activities?
4. Are there any differences between results of retention test conducted to evaluate persistency of results of education given to three different groups (E1, E2, and C) and results of posttest?

METHOD

Model of the Study

The study used pretest-posttest, two test groups and one control group test design. Dependent variable of this design was children's learning emotion concepts (happy, sad, confused, scared, angry) and independent variable is educational drama program that includes evaluative questions and supportive activities.

Experimental and Control Groups

Forty-one 60-72 month-old children participated in the study who attended preschool on 2012-2013 education year at Istanbul, Esenler district public school, named 50. Yıl Tuna Primary School. The level of income that children's families belong to was at middle socio-economical level. Information on this was received from class teachers and school managers.

Forty-one children in the same age group that attended 2 different preschool classes of the same primary school were randomly assigned to Experimental1, Experimental2, and Control groups.

Children in Experimental1 group have a mean age of $\bar{x}=62.0$ months according to their birthdays while children in Experimental2 group have a mean age of $\bar{x}=62.6$ months according to their birthdays and children in Control group have a mean age of $\bar{x}=61.2$ months according to their birthdays. Experimental1, Experimental2, and Control groups have close age distribution according to children's birthdays.

Data Collection

Data collection took place as establishment of Experimental1, Experimental2, and Control groups; filling out of Demographic Information Form and making Emotion Concepts Scale pretest; its application on the groups; making posttest and follow-up test.

Children in test groups were applied the program about emotion concepts that was prepared by the researcher. All children in test and control groups were applied Concept Development Scale as pretest in advance of the study. A total of 41 children took part in the study 14 of which were placed in Experimental1 group, 13 in Experimental 2 group, and 14 in Control group. An education program including six-stage evaluative questions and supportive activities (Önder, 2012) were applied in Experimental1 group while Experimental 2 group was applied the same drama plays that were applied in Experimental1 group without the six-stage evaluation and support activities and Control group was not applied any emotion activities but only some game and drama activities. This process continued for 8 weeks. Following this application Emotion Concepts Scale was applied to all 3 groups as posttest. Two weeks after posttest Emotion Concepts Scale was applied once more as retention test in order to measure the level of concept recognition.

Data Collection Tools

The study used ‘Demographic Information Form’ that collected demographic information about children in Experimental and Control groups and Emotion Concepts Subscale from ‘Concept Development Scale (Avşalak, 2007)’ that was used in pretest, posttest, and retention measurements as data collection tools.

Demographic Information Form

This form encompasses gender, date of birth, and socioeconomic status information of children in study group. Class teachers and school principals assisted collection of the information on this form.

Concept Development Scale

Validity-reliability studies of the scale developed by Avşalak (2008) were conducted in the beginning of 2006-2007 education year with a total of 136 children at 60-72 months of age (5-6 years) 100 of which was from Küçükçekmece Municipality Preschool and 36 from Marmara University Göztepe and Haydarpaşa Practice Preschools (Avşalak, 2007). However these studies were directed towards the whole scale. In the study by Avşalak (2007) validity and reliability data of Emotion Concepts Scale under Concept Development Subscale used in this study were not given separately. Thus internal reliability and test-retest reliability analyses were conducted for the said Emotion Concepts Subscale in this research and the subscale was determined to have sufficient internal reliability and test-retest reliability.

Educational Drama Program for Developing Emotion Concepts

While preparing educational drama programs for developing emotion concepts, content validity of the program was tested first. In order to provide this expert opinions were taken to evaluate if activities in this program were suitable for fulfilling the purpose. While expert opinions were being taken, suitability of each and every one of the 8 drama applications in the program to teach children emotion concepts was questioned and the data collected were analyzed using Lawshe (1975) method to achieve sufficient statistical proof on expediency of the activities.

FINDINGS

The results of the research were presented below.

Pretest Findings of Experimental1, Experimental 2, and Control Group

Table1 . Pretest Findings of Experimental1, Experimental 2, and Control Group

Group	N	AR	SR	U	Z	p
Exp.1	14	12.65	177.50			
Control	14	12.21	171.00	72.50	-1.18	.23
Exp.2	13	16.79	235.00			
Control	14	16.32	228.50	66.00	-1.48	.13
Exp.1	14	14.25	199.50			
Exp.2	13	14.75	206.50	94.50	-.16	.87

Mann Whitney-U test was conducted to compare Emotion Concepts Scale pretest scores of children at Experimental1, Experimental2, and Control groups. According to data collected, it is possible to argue that groups have no difference amongst each other before application in terms of emotion concepts that would be taught.

Posttest Findings of Experimental1, Experimental2, and Control Groups

Table 2. Posttest Findings of Experimental1, Experimental2, and Control Groups

Group	N	AR	SR	U	Z	p
Exp.1	14	21.50	301.00			
Control	14	7.50	105.00	.00	-4.53	.00*
Exp.2	13	20.54	267.00			
Control	14	7.93	111.00	6.00	-4.15	.00*
Exp.1	14	18.86	264.00			
Exp.2	13	8.77	114.00	23.00	-3.34	.00*

*p<.05

In order to test the effect of education programs used at both test groups, the Emotion Concepts Scale used at pretest was used at posttest measurement following applications at every 3 groups.

When posttest scores of Experimental 1 and Control groups were compared, a statistically significant difference was found between the two groups (U= .00, p<.05). This difference is in favor of Experimental1 group (Mean rank for Experimental1 D1 \bar{x} = 21.50, for Control group K \bar{x} = 7.50).

When posttest scores of Experimental2 and Control groups were compared, a statistically significant difference was found between the two groups (U=6.00, p<.05). This difference is in favor of Experimental2 group (Mean rank for Experimental 2 D2 \bar{x} = 20,54, for Control group K \bar{x} = 7.93).

When posttest scores of Experimental1 and Experimental 2 groups were compared, a statistically significant difference was found (U=23.00, p<.05). This difference is in favor of Experimental1 group (Mean rank for Experimental1 D1 \bar{x} = 18,86, for Experimental2 group D2 \bar{x} = 8.77).

Findings from Comparison of Pretest and Posttest Scores of Experimental 1, Experimental 2, and Control Groups

Table 3. Findings from Comparison of Pretest and Posttest Scores of Experimental 1, Experimental 2, and Control Groups

Groups	Tests	N	AR	SR	sd	z	p
Exp.1	Pretest	14	.00	.00	.14		
	Posttest	14	7.00	91.00	.06	-3.19	.00*
Exp.2	Pretest	13	1.00	1.00			
	Posttest	13	6.50	65.00	6.00	-2.85	.00*
Control	Pretest	14	7.29	51.00	.09		
	Posttest	14	6.67	40.00	.08	-.38	.69

*p<.05

Wilcoxon Signed Ranks Test was applied in order to compare level of knowledge Experimental1, Experimental2, and Control groups had about emotion concepts before and after the application and the following findings were discovered.

When pretest and posttest scores of Experimental1 group were compared, a statistically significant difference was found between the two applications ($z=-3.63$, $p<.05$). This difference was in favor of posttest (Mean ranks for Experimental 1 group pretest $\bar{x}=0.00$, for posttest $\bar{x}=7.00$).

When pretest and posttest scores of Experimental2 group were compared, a statistically significant difference was found between the two applications ($z=-2.85$, $p<.05$). This difference was in favor of posttest (Mean ranks for Test2 group pretest $\bar{x}=1.00$, for posttest $\bar{x}=6.00$).

When pretest and posttest scores of Control group were compared, no statistically significant difference was found between the two applications ($z=-.38$, $p<.05$). (Mean ranks for Control group pretest $\bar{x}=7.29$, for posttest $\bar{x}=6.67$).

Findings from Comparison of Posttest and Follow-Up Test Scores of Experimental 1, Experimental 2, and Control Groups

Table 4. Findings from Comparison of Posttest and Follow-Up Test Scores of Experimental 1, Experimental 2, and Control Groups

Groups	Tests	N	AR	SR	sd	z	p
Exp.1	Posttest	14	7.50	22.50	.05	-1.63	.10
	Follow-up Test	14	6.85	68.50	.08		
Exp.2	Posttest	13	6.50	13.00	.25	-1.5	.13
	Follow-up Test	13	5.25	42.00	.06		
Control	Posttest	14	7.07	49.50	.18	-.84	.40
	Follow-up Test	14	5.70	28.50	.16		

When posttest and follow-up test scores of Experimental1 group were compared, no statistically significant difference was found between the two applications ($z=-1.63$, $p>.05$).

When posttest and follow-up test scores of Experimental 2 group were compared, no statistically significant difference was found between the two applications ($z=-1.5$, $p>.05$).

When posttest and follow-up test scores of Control group were compared, no statistically significant difference was found between the two applications ($z=-.84$, $p>.05$).

All three groups were applied follow-up tests 2 weeks after posttests. According to the results of follow-up test no difference could be found between posttest and follow-up test. Thus, it can be concluded that level of learning in all three groups remained unchanged after 2 weeks.

RESULTS AND DISCUSSION

Pretests applied to all 3 groups demonstrated that there were no differences amongst the groups in terms of emotion concepts that would be taught.. Thus, regarding the main research questions of this study the relevant program could be applied, analyses made and results presented as follows.

According to the results of posttests Experimental1 group was found to be more successful in learning emotion concepts compared to control group.

According to the results of posttests Experimental2 group was also found to be more successful in learning emotion concepts compared to control group.

When Experimental1 and Experimental2 groups were compared, findings of posttests revealed that Experimental1 group was more successful in learning emotion concepts than Experimental2 group. In addition, when pretest and posttest results of Experimental1 were compared, level of learning at posttest was found to be higher. Thus it can be concluded that learning was achieved at the highest level in Experimental1 group.

According to the comparison of results from posttest and follow-up test made 2 weeks later for Experimental1, Experimental 2, and Control groups no statistically significant difference was found at any of the groups. On the basis of these results it can be argued that level of learning did not decrease at Experimental1 group in which evaluation questions and supportive activities applied following drama play. As a result it can be said that acquired learning was permanent up to 2 weeks.

When the results cited above are generally evaluated, two sets of basic information can be deduced. One of them demonstrates that educational drama, even when it is applied only as drama play, has a positive effect on preschool children as they learn emotion concepts. There are a number of studies that point at positive effect of drama plays on learning of preschool children on any topic whether such drama plays are defined as educative drama or creative drama (Aral et. al., 2003; Dalkılıç and Gönen, 1998; Üstündağ, 1998).

A significant and unique result of this study is that conducting the 6-stage evaluation/discussion questions and supportive activities as suggested by Önder (1995), leads to learning of emotion concepts at the highest level compared to other approaches, contending with drama plays only or never applying drama plays at all. As a general idea of this research it can be mentioned that especially teachers and other practitioners working with preschool children should use drama activities in education not only in the form of plays but they also use some evaluative questions and some other teaching activities at the end of the dramatic plays.

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References

- Aral, N., Baran, G., Çimen, S., Pedük, Ş. (2003). *Eğitimde drama (Drama in education)*. Istanbul: Ya-pa Publishing.
- Altınay, D. (2000). *Yaşama dair çok şey (A lot about life)*. Istanbul: Sistem Publishing.
- Avşalak K. (2008). *Okul öncesi dönem 60-72 aylık çocuklara uygulanan müzik eğitiminin kavram gelişimi üzerindeki etkisinin incelenmesi (A study of the effect of music teaching on concept development of 60-72 month-old preschool children)*. Marmara University Master's Thesis.
- Cranston, J. W. (1991). *Drama in education*. Lanham: University Press of America.
- Dalkılıç, N. U., Gönen, M. (1998). *Çocuk eğitiminde drama (Drama in child education)*. Istanbul: Epsilon Publishing
- Fulford, J., Huthings, M., Ross A. Ve Schmitz, H. (2001). *İlköğretimde drama (Drama in primary school) (L., Küçükahmet, H. Borçbakan, S., Karamanoğlu, S. Çev.)*. Ankara: Nobel Publishing.
- Heing, R.B., (1981). *Creative drama for the classroom teacher (Second Ed.)*. Englewood Cliffs, New Jersey: Prentice Hall Inc.
- O'Neill, C. and Lambert, A. (1988). *Drama structures: A practical handbook for teachers*. Portsmouth: Heinemann Education Books.
- Önder, A. (2003). *Okul öncesi çocuklar için eğitici drama uygulamaları (Educational drama applications for preschool children)*. Istanbul: Morpa Publishing.
- Önder, A. (2007). *Yaşayarak öğrenmek için eğitici drama (Educational drama to live and learn) (7th Edition)*. Istanbul: Epsilon Publishing.
- Önder, A. (2012). *İlköğretimde eğitici drama temel ilkeler, uygulama modelleri ve örnekleri (Basic concepts, application models, and examples of educational drama at primary school)*. Istanbul: Morpa Publishing.
- Sevinç, M. (2003). *Erken Çocuklukta Gelişim ve Eğitimde Yeni Yaklaşımlar (New approaches in early childhood development and education)*. Istanbul: Morpa Publishing.
- Siks, G. B. (1983). *Drama with children*. New York: Harper & Row
- Ülgen, G. *Kavram Geliştirme (Concept development)*. Pegema Publishing 3rd editon. Ankara, February, 2001. pp.109, 117, 136-138.
- Üstündağ, T. (1998). *Yaratıcı drama eğitim programının öğeleri (Elements of a creative drama education program)*. Eğitim ve Bilim Dergisi (Education and Science Magazine), 22(107), 28-35.

Yurdağül, H. (2005). Ölçek geliştirme çalışmalarında kapsam geçerliği için kapsam geçerlik indekslerinin kullanılması (Using the concept validity indices for concept validity in scale development studies). 14th National Education Sciences Congress, Pamukkale University Faculty of Education.

The Effect Of Dynamic Geometry Software On Prospective Teachers' Achievement About Locus Problems

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ABSTRACT

Geometric locus problems are topics that students find difficult to understand. To solve these problems, students must obtain the ability to think abstractly. Nevertheless, in the courses carried out with pen and paper, these skills are not enough to understand the geometric locus problems. The lack of moving structures and monitoring in traditional environment requires the need for alternative learning environment. Dynamic geometry software constitutes different learning environments for teachers and students. This software has features such as dynamic free dragging, dynamic measurements, transformations, animation and locus (Gao, 1998). The aim of this study is to determine the effect of dynamic geometric software on prospective mathematics' teachers' achievement on locus problems. For this aim, quasi experimental design was used. The study took place during the 2014–2015 spring semester at Bülent Ecevit University in Zonguldak city of Turkey. Of the 65 prospective teachers who participated in the study, 32 were in the control group. The remaining 33 prospective teachers were in the experimental group. Locus problems were solved in experimental group with dynamic software (Cabri and Geogebra). In the control group classes were conducted in traditional learning environment. A data collection tool has been developed which consists of 10 open-ended questions. This tool was applied before and after the implementation in both group. The findings showed that the dynamic geometry software has a positive effect on prospective teachers' achievement on locus problems.

INTRODUCTION

Development of technology has led the educators to take step towards the integration of computer into learning environment (Akkaya, Tatar, & Kağızmanlı, 2011). Computers have changed the way we teach mathematics. The use of computers in the teaching of mathematics is receiving increasing attention from teachers and researchers. Computers are the most preferred and utilized tools in education among the available technologies, and they have many properties. Computer-aided teaching helps students develop high level of cognitive skills and allow students to live experiences of a mathematician and construct their own mathematics (Baki, Güven & Karataş, 2002). The aim of using computer in mathematics instruction is to increase students' interest towards the subject and to help them understand the concepts visually easier where they have difficulty to imagine via traditional instruction (Yıldız, Güven & Koparan, 2010).

Since geometry is founded on abstract structures, some difficulties may be encountered in understanding some geometrical concepts such as locus (Açıkgül & Aslaner, 2012; Güven, & Karataş, 2009). The concept of locus; defined as a cluster of points with the same characteristics (Sarıgül, 2001). Most students will not move the point in a structure and even it is almost impossible to imagine for students. Because of the difficulty in visualizing geometric problems they are often not included in textbooks (Cha & Moss, 2004). Locus problems are different from each other and thus it is very difficult for them to develop materials in traditional media. At the same time, locus problems in the traditional learning environment where work carried out using pencil and paper are quite difficult (Güven & Karataş, 2009). The majority of the studies in the literature for solving the locus problems are to emphasize the dynamic geometry software (Antohe, 2009; Baki, Çekmez, & Kösa, 2009; Botana & Valcarce, 2003; Botana, Aba' Nades & Escibano, 2011; De Villiers, 2008 Gorghiu et al., 2009). Dynamic geometry software is a highly effective tool to solve these problems related to locus (Güven, 2008; Güven & Karatas, 2009; Jahn, 2002; Real & Leung, 2006). They have features such as track and locus. These properties offer new possibilities for locus problems (Cha & Moss, 2004; Jahn, 2002). Thanks to these features, locus of a point can be easily visualized. Thus, students can determine the locus of a point relative to another point in the structure. Dynamic geometry software interactively offers students the opportunity to explore how the locus occurred.

There is different qualitative research on the use of dynamic geometry software in the process of solving locus problems in the literature. However, the effect of dynamic geometry software on student or prospective teachers' achievement about locus problems has not been studied so much up to now.

The purpose of this study is to investigate the effect of dynamic geometry software on prospective mathematics' teachers achievement related to locus problems and it is also evaluating opportunities offered by the dynamic geometry software.

THE STUDY

Quasi experimental design was used in this study. All participant solved problems by using paper-pencil approach before the implementation. At the beginning of the study, technical features of Cabri II and Geogebra software was introduced to experimental group. Emphasis was given on how to give computer-assisted instruction in geometry courses using this software; after then, they used software for making their solutions. During the study, the prospective teachers were observed in their natural environment. In the control group, classes were conducted in traditional learning environment.

The study took place at Bülent Ecevit University in Zonguldak city of Turkey. It was carried out in the spring semester of 2014-2015 academic year on 65 prospective teachers who are third-year university students in a department of elementary school mathematics teaching. Of the 65 prospective mathematics teachers who participated in the study, 32 were in the control group. The remaining 33 prospective teachers were in the experimental group. The prospective teachers in the sample group volunteered for the study.

The data in this study were collected using a test developed related to geometry. The test was developed by two researchers working in the field of geometry education. This test consists of ten open ended questions related to locus problems and concept. These ten open-ended questions are shapeless. A pilot study was conducted before the actual implementation. Thus probable deficiencies were sought related to the questions. In this way, the appropriateness of the questions was tested. Participants are asked the following questions;

What is the circle? Please define.

What is the parabola? Please define.

What is an ellipse? Please define.

What is the hyperbola? Please define.

What is the locus of the intersection of the central pillar of the beams in a circle?

What is the locus of the intersection of the edge of the central pillar of a triangle?

What is the geometric point of equal distance from two fixed points in the plane?

What is the locus of the intersection of the internal bisector of a triangle?

Draw a triangle on the circle. What is the locus according to a corner of the triangle's center of gravity?

Draw an angle of 120 degrees. Draw an equilateral triangle with two corners on the arm angles. What is the locus of the third corner?

The study has completed a total four weeks. First and last week pre-test and post-test are conducted. The application process was carried out in the computer lab for six hours. Quasi-experimental design was used in this study and activities lasted 4 weeks. In the pre-test all prospective teachers were asked to solve locus problems with paper and pencil. Then half of the class was defined as experimental group and the rest as control group. Subjects in the experimental group were held in computerized environments (3 hours per week for 2 weeks). Cabri II and Geogebra software was used as the software and various applications about locus subject were carried out. In the control group, the same procedure was followed without using dynamic geometry software. These problems are solved sometimes by students, sometimes by the instructor. A majority of the solutions showed an algebraic characteristic

Prospective teachers' answers to questions about locus before and after application were examined. The obtained data were used for statistical analysis with SPSS. At the same time, the differences between answers of experimental and control group were qualitatively examined.

FINDINGS

The findings from the questions related to locus problems are given in this section. The results were presented as findings from quantitative data and the findings from qualitative data.

The findings from quantitative data

The data obtained from the quantitative were analyzed using SPSS programme (t test and covariance analysis). Independent t-test was performed to determine whether a significant difference exists between the pre-test scores of the prospective teacher in experimental and control groups and the results were given in Table 1.

Table 1. Independent two sample t test results

	Group	N	Mean	SD	SD Error Mean	sd	t	p
Pre-test	Exp.	33	34,54	12,01	2,09	63	0,635	0,528
	Cont.	32	32,50	13,91	2,45			

Looking at the measures of the two groups pre-test averages are very close to each other (34,54 and 32,50). The result of the experimental and control groups compared to pretest before the implementation by the t test results, there is no difference between groups $t(63) = 0,635$, $p > 0,05$. Experimental group t test result was given in Table 2.

Table 2. Experimental group pre-test and post-test t test results

Exp. Group	N	Mean	SD	SD Error Mean	sd	t	p
Pre-test	33	34,54	12,01	2,09	32	-11,898	0,000
Post-test	33	65,15	13,94	2,42			

Looking at the results of the experimental groups the average score of prospective teachers at the pre-test was 34,54 (SD = 12,01), while the average score at post was 65,15 (SD = 2,42). Results from a dependent t-test indicate that this difference was significant, $t(32) = -11,898$, $p < 0,05$. Supported with dynamic geometry software learning approach may be regarded as a positive effect on prospective teachers' achievement. Control group t test result was given in Table 3.

Table 3. Control group pre-test and post-test t test results

Control Group	N	Mean	SD	SD Error Mean	sd	t	p
Pre-test	32	32,50	13,91	2,45	31	-5,536	0,000
Post-test	32	43,43	11,53	2,03			

Looking at the result of the control groups, the average score of prospective teachers at the pre-test was 32,50 (SD = 13,91), while the average score at post-test was 43,43 (SD = 11,53). Results from a dependent t-test indicate that this difference was significant, $t(31) = -5,536$, $p < 0,05$. Traditional teaching method may be regarded as if it has a positive effect on prospective teachers.

Table 4. Analysis of Covariance Results

Source	SS	df	MS	F	p
Pretest	2403,939	1	2403,939	18,766	0,000
Method	6944,303	1	6944,303	54,210	0,000
Error	7942,179	62	7942,179		



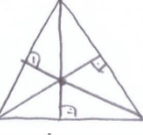



A one-way analysis of covariance was conducted in this study. ANCOVA results were given in Table 4. The independent variable supported with dynamic geometry software learning environment was the prospective teachers' success and the covariate was the prospective teachers' score on the pre-test. The ANCOVA was significant, $F(1, 62) = 54,210$, $p < .05$ and $\omega^2 = 0,47$. According to the results of ANCOVA, the experimental group's and control group's pre-test scores are under control, a statistically significant difference was found between post-test scores.

The findings from qualitative data

When qualitative data obtained from the study analyzed, it was seen that the teachers in the control group did not define conic sections (parabola, ellipse and hyperbola) with locus. Many of the definitions were found to be as follows; the shape that occurred after cutting the cone, graphs of quadratic equations or quadratic function. However, it was seen that the prospective teachers in the experimental group used geometric locus in the majority of the responses.

The majority of the prospective teachers in the control group were observed that they confused some locus such as locus of the intersection of the edge of the central pillar of a triangle, locus of the intersection of the internal bisector of a triangle. In the experimental group, it was observed that this situation is much less. Table 5 shows examples of sections of experimental and control groups response.

Table 5. Examples of sections of experimental and control groups response

Question	Control Group	Experimental Group
2	2. Derece fonksiyonların grafiğidir.	Bir düzlemde alınan sabit bir d değeri ile sabit bir F noktasından sit uzaklığı; noktaların geometriyi göstermektedir.
3	Bir koninin bir düzlem tarafından kesilmesi.	Bir düzlemde verilen 2 noktaya uzaklıkları toplamı sabit olan noktalar kümesi.
5	 Çapın üzerindedir.	 Geometrinin merkezidir.
6	 G ağırlık merkezidir.	 Genel geometrinin merkezi.
8	 Açıortayların kesim noktası Ağırlık merkezidir.	 İç teğet çemberinin merkezi.

It is believed that the differences between the groups emerged from the created learning environment. Because prospective teachers in the experimental group have established various structures through dynamic geometry software and they have made observation and generalization by moving these structures. So they could be able to visualize the situation which is never dreamed with paper and pencil. This situation has contributed to prospective teachers to learn more permanently about locus.

CONCLUSIONS

In this study, the effect of dynamic geometry software on locus problems was explored. The results and the recommendations based on these results were presented as follows:

It was determined that there are some difficulties in understanding the locus problems using pencil and paper. These difficulties are; inability to move the points on the paper, the lack of proper shape to be drawn, it is not enough to form a mathematical description. This finding is consistent with the results of studies in the literature (Açıkgül & Aslaner, 2012; Güven & Karataş, 2009). In contrast to traditional learning in the process of using dynamic software, prospective teachers got opportunities such as to make hypothesis, to move the structure to test hypotheses, to show trace and to make generalization. During these activities, prospective teachers experienced some difficulties about using geometry knowledge and using software. Nevertheless, they could use their geometry knowledge in the solution of locus problems and using dynamic software allowed them to use different thinking skills. Dynamic geometry software completes and enriches them rather than the replace of the traditional tools. There are several studies that comply with these findings in the literature (Baki, Güven & Karataş, 2002; Camargo, Samper & Perry, 2007; Ceylan, 2012; Filiz, 2009; Kokol-Voljc, 2007).

As a result dynamic geometry software (Cabri II and Geogebra) was found effective in solving locus problems. This result reveals that a computer assisted environment prepared by using Cabri 2d and Geogebra enabled the prospective teachers in this study to make their knowledge more meaningful. In other words, dynamic software was found to positively contribute to prospective teachers in geometry learning. Based on these results, the following recommendations were made:

Dynamic geometry software assisted practices may be extended to other subjects of geometry as shown in this study. This will facilitate instruction of abstract concepts of geometry. Considering the difficulties in solving locus problems and contributions of dynamic software, we recommend the use of this software in the classroom. This study focuses on the locus problem. The effects of dynamic geometry software can be analyzed by considering different issues. Cabri 2d and Geogebra are used in this study. Outstanding and weaknesses are designed studies comparing the use of different software. Comparing high and weaknesses using different software is recommended. There is general consensus in the mathematics education community that students need a deep and meaningful understanding of any mathematical content. Consequently, dynamic geometry

software would be useful for teachers to consider the appropriate formative experiences that will foster the students' capacity for ongoing geometry learning, help them reflect on the nature of geometry, and help them value mathematical knowledge in classroom.

References

- Açıkgül, K., & Aslaner, R. (2012). Matematik öğretmen adaylarının geometrik yer problemlerini çözüm sürecinde karşılaştıkları güçlükler ve bilgisayar destekli çözüm önerileri. *X. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi Özet Kitapçığı*, 27-30 Haziran, Niğde Üniversitesi, Niğde.
- Antohe G.S. (2009). Modeling a geometric locus with Geogebra. *Computer Science Series*, 7(2), 105-112.
- Baki, A., Güven, B., & Karataş, İ. (2002). *Learning by discovery using dynamic geometry software cabri*. Paper presented at the meeting of 5th National Science and Mathematics Education Congress, Middle East Technical University, Ankara.
- Baki, A., Çekmez E. & Kösa, T. (2009). Solving geometrical locus problems in Geogebra. *Geogebra Conference, 14-15 July*, RISC in Hagenberg.
- Baki, A., Kösa, T., & Karakuş, F. (2008, May). *Using dynamic geometry software to teach solid geometry: Teachers' views*. Paper presented at the meeting of 8th International Educational Technology Conference, Anadolu University, Eskişehir.
- Botana, F., & Valcarce, J. L. (2003). A software tool for the investigation of plane loci. *Mathematics and Computers in Simulation*, 61, 139-152.
- Botana, F., Aba' Nades, M. A. and Escribano J. (2011). Exact Internet Accessible Computation of Paths of Points in Planar Linkages and Diagrams. *Computer Applications in Engineering Education*, 19(4), 835-841.
- Cha, S., & Moss, R. (2004). Investigating Students Understanding of Locus with Dynamic Geometry, [Online] Retrieved on 12-April 2006 at URL: http://www.ioe.ac.uk/koreansociety/cha_moss02.pdf.
- Camargo, L. Samper, C. ve Perry, P. (2007). Cabri's role in the task of proving within the activity of building part of an axiomatic system. *CERME 5, Working Group: Argumantation and Prof*, 571- 580.
- Ceylan, T. (2012). *Geogebra Yazılımı Ortamında İlköğretim Matematik Öğretmen adaylarının geometrik ispat biçimlerinin incelenmesi*. Yüksek Lisans Tezi, Ankara Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
- De Villiars, M. (1998). An Alternative Aproach to Proof in Dynamic Geometry, (Ed. Lehrer, R., Chazan, D.) *Designing Learning Enviroments for Developing Understanding of Geometry and Space*, Lawrance Erlbaum Associares, 369-393.
- Filiz, M. (2009). *GeoGebra ve Cabri Geometri II dinamik geometri yazılımlarının web destekli ortamlarda kullanılmasının öğrenci başarısına etkisi*. Yüksek Lisans Tezi. Karadeniz Teknik Üniversitesi, Trabzon.
- Gao, X. S. (1998). Automated geometry diagram construction and engineering geometry, in: *Proceedings of the ADG'98, Lecture Notes in Artificial Intelligence*, vol. 1669, Springer, Berlin, pp. 232–257.
- Gorghiu, G. Puana, N. and Gorghiu L. M. (2009). *Solving geometrical locus problems using dynamic interactive geometry applications*. <http://www.formatex.org/micte2009/book/814818.pdf>
- Güven, B., & Karataş, İ. (2009). Dinamik geometri yazılımı Cabri'nin ilköğretim matematik öğretmen adaylarının geometrik yer problemlerindeki başarılarına etkisi. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*. 42(1), 1-31.
- Güven, B. (2008). Using Dynamic Geometry Software to gain insight into a proof. *International Journal Computer Mathematics Learning*. 13, 251–262.
- Jahn, A. P. (2002). "Locus" and "Trace" in Cabri-Geometre: Relationship between geometric and functional aspects in a study of transformations. *ZDM*, 34(3), 78-84.
- Kokol-Voljc, V. (2007). Use of mathematical software in pre-service teacher training: the case of DGS. In D. Kuchemann (Eds.) *Proceedings of the British Society for Research into Learning Mathematics*, 27(3), 55-60.
- Real, F.L. & Leung, A. (2006). Dragging as a conceptual tool in dynamic geometry environments. *International Journal of Mathematical Education in Science and Technology*. 37(6), 665-679.
- Sarıgül, Ö.E. (2001). *Lise 2 Geometri Ders Kitabı*, Ankara: MEB Yayınevi.
- Tatar, E., Akkaya, A., & Kağızmanlı, T.B. (2011). İlköğretim Matematik Öğretmeni Adaylarının GeoGebra ile Oluşturdukları Materyallerin ve Dinamik Matematik Yazılımı Hakkındaki Görüşlerinin Analizi. *Turkish Journal of Computer and Mathematics Education*. 2(3), 181-197.
- Yıldız, C., Güven, B., & Koparan, T. (2010). Use of Cabri 2d software in drawing height, perpendicular bisector and diagonal. *Procedia Social and Behavioral Sciences* . 2040–2045.

The Effect Of The Computer Game Developed For The 7th Grade Science Lesson, On Student's Self-Efficacy Toward Science

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ABSTRACT

Human being starts learning about life via games. Therefore games have always maintained their importance and have always been interesting since the beginning of the human life. Games are being moved from streets to virtual platforms today as information Technologies are considerably progressing. And because of that, computer games are one of the entertainments for people today, especially for the children of school age. Analysing the literature, we find the computer games to have many positive effects on children's performance at school.

In this research, the effect of the computer game developed for the 7th grade science lesson, on student's self-efficacy toward science is studied. Quasi-experimental design is used as the quantitative research method. The study group consists of 444 7th grade students in total attending to 7 different schools chosen from 7 different regions in Turkey. In this context, while there has not been any interference to the students attending to one of the 7th grade classrooms chosen from each school, the other students are provided with the computer game which is developed in the context of the application as an additional exercise. Seven experimental groups and seven control groups were chosen from each region in total one of which is the control group and the other is experimental group. "Science Self- Efficacy Scale" was drawn on as the data collection tool. The scale was applied two times in total, the first of which was before the application and the second after the application.

As the result of the study, the developed computer game is determined to be an effective material in increasing the students' self-efficacy toward Science. In addition, It is concluded that there are regional differences regarding the students' self efficacy.

Keywords: Computer Game, Science Education, Self-Efficacy

INTRODUCTION

Human beings start learning about life via games. For this reason, games have always been interesting and maintained their importance throughout the history. In addition to being entertaining, games, at the same time, allow the player to learn new things (Gungormus, 2007)

Accomplishing productive results in education is closely related to the teaching's being planned and carried out in a way to get the maximum performance from the students. J. Locke lays emphasis on making use of the games for a more productive lesson teaching. And Fenelon states that promoting the teaching with games spirits away the boring, monotonic and theoretical form of teaching while making it become an entertaining and amusing process (Ergun, 1980). Furthermore, taking the games with the purpose of teaching makes it possible to have a productive lesson and gives the students the opportunity to engage actively and construct the knowledge by themselves in the teaching process (Hagbood, Ainsworth and Benford; 2005).

In today's world where the information technologies have considerably developed, games have been moved from streets to virtual platform and have become one of the entertainments of people, especially of the children of school-age. And the reason of this lies behind the real-like virtual platforms with audio, image and the ascribed roles for the players (Brand, Knight and Majeovski; 2003). The computer games' becoming considerably popular among people has increasingly led to the development of computer games sector. The effect of computer games and its popularity have extremely increased with the applications enabling tens of thousands of people simultaneously to play games at the same virtual platform (Tuzun et. al, 2009)

Since 1970's when the first computers games were designed, the developments in computer sector have yielded the development of the game sector correspondingly. Since 2000's multi – user (online) computer games have become highly popular. Sharing the same game's enthusiasm at the same virtual platform with the users from the different parts of the world has drawn the attention of computer users (Emekli, 2002; Akkemik, 2007). In a research he has done, Yagız (2007) stated that the computer games took up the most of the time of today's

children with the development of technology. In his same research again, he expressed that while in 1980's children spent 4 hours in average at home or in an arcade, today, as the children of school – age, girls spend 5,5 hours and boys 13 hours in average and that this time was increasing day by day (Yagiz, 2007). As a consequence of that, the time students saved for their education has decreased and they do not have enough time for their homework. Students' acting this way causes a decline in their achievements at school and their declining achievements and interests in the lessons distresses their parents.

That unfavourable situation and the computer games' being a considerable part of students' life day by day were noticed by the teachers as well, and they came up with the idea of integrating the highly welcomed computer games with the teaching. And thanks to that idea, the computer games, today, are being used for various purposes in almost all fields, from social to historical, health to military. This way, it is thought that the deficiencies of the traditional learning environment can be perfected by educational computer games, making it become more entertaining and interesting but boring (Dogusoy and Unal, 2006).

Garris, Ahlers and Driskell explain how to use computer games in teaching as follows:

- Today, we move from traditional teaching method of presentation to student-centered teaching method where the learner is more active. Consequently, the students must be provided with a learning environment where they can learn by experience, not only by listening to the lessons.
- Some of the experimental studies in literature indicated that the computer games could be used as an effective tool when teaching the complicated subjects.
- According to the educators, this voluntary active engagement could be drawn on as a motivation tool to accomplish educational goals considering the great number of students playing computer games and the interest people have in playing games (Garris et al., 2002, p.441-442).

And Papastreghiou (2009) attributes the computer games' being effective learning environments to those;

- Games make learning become a multi-sensory, active, experimental and problem-focused one.
- And the obligation of the students to use the prior knowledge to proceed in the game supports the effective memorability of the rudiments.
- Games ensure that the learning is organised, and offer instantenous feedbacks that help learning.
- The scores and the different levels in games offer self-assessments for students.
- Games are increasingly becoming social environments with the community of players they involve.

When the body of literature is analyzed, the computer games were found to have many positive effects on children's performance. The computer games which are played just for fun can make children obtain the information necessary for them during the game (Pillay, 2002; Prensky, 2001; Tuzun et al., 2009; Ural, 2009; Vos, var der Meijden and Denessen, 2011). Moreover the experts underline the fact that computer games can create a new type of learning culture and that it can meet the demands of the stuedents all the better. This way, it would be possible to turn the disadvantages resulting from the harmful effects of the computer games that parents and educators complain about into advantages (Gros, 2007). Considering the potential that the computer games have, today's experts recommend using the computer games in the classrooms on the intent of providing students a better learning environment and promoting their learning capacities (Prensky, 2001; Gros, 2007; Papastreghiou, 2009).

Prensky (2001), attributed the computer games' being that interesting to those 12 reasons;

A computer game;

1. is in the form of entertainment and gives us pleasure.
2. is a format of playing and enables interest and attendance.
3. has rules and that ensures we make a plan.
4. 's targets motivate us.
5. requires us to do something because it is interactive.
6. is in a flow and can be adapted.
7. provides an opportunity to learn by the outputs and feedbacks.
8. achievements facilitates the ego satisfaction.
9. brings us adrenalin because it has conflict, difficulty, competition and contrast.
10. developes creativity because it requires problem solving.
11. makes it possible to establish social groups because it is interactive.
12. brings us emotions because it has demonstraton and story.

The 6 of those (rules, targets, outputs and feedabcks, conflict/difficulty/competition/contrast, interaction and story) are named as the items that make it a game (Prensky, 2001).

Science teaching must bring in required customs and understandings to make students think about their own purposes and have responsibilities and challenge with problems in the future. In addition science teaching must contribute students to grow up as citizens constituting open society which, among the developed World countries, has an important place (Koseoglu, et al., 2003). The skills the students gain by the science teaching are aimed to be used throughout their life. The level the students could reach the determined goals is affected by many factors. The features of the learning environment, the characteristics of the teacher and the students affect the students achievements. The students' confidence in science affects their performance and engagements in activities. And one of the qualities affecting the performance in science lesson is the students' self – sufficiency.

Bandura (1986) defined the confidence as “the judgements people make about their organizing the actions and performing their skills that could help them accomplish a certain performance”(As cited in Kotaman, 2008). According to this definition, the self – sufficiency is one's belief in doing any skill or performing any behaviour. The idea that emerges in mind before doing an activity causes a positive or a negative attitude towards the activity that is to be done in accordance with one's prior knowledge. Bandura's theory states that the human behaviour is directed by a type of self – control mechanism that derives its source from one's beliefs regarding himself and his environment, and brings a perspective that makes an individual both a producer and a product in their environment and social system (Senemoglu, 2004). According to the social learning theory there is an ego system in individuals enabling them to control their emotions, thoughts, motivations and actions. This system provides an individual a self – regulatory mechanism to understand, regulate and assess his/her behaviour. The results of the individual's actions, levels of achievements and the judgements regarding the environment have a determinant effect on his/her subsequent behaviours (Henson, 2001 – As cited in Ozerkan, 2007).

The sense of self-sufficiency is the basic determinant of the individual's motivation for an activity. The self-sufficiency is one's judgement on his abilities during a period of accomplishing a specific goal (Aydiner, 2011). These judgements are significant especially when they have negative aspects. When this is the case, the people who have a sense of high self-sufficiency will probably achieve their goal by working with will and patience and with confidence on a certain target. On the other hand, people who doubt they have enough capacity or skill are quite likely to fail. In Social Learning Theory, the sense of self-sufficiency is also addressed when explaining the concepts of teaching and learning and human behaviour. The self-sufficiency of an individual can clearly be observed from his/her behaviour. Because a person with a high sense of self-sufficiency does something with an intrinsic motivation without a need of extrinsic motivation (Erden, 2007).

It is analyzed from the literature that the computer games are not employed sufficiently (Prensky, 2001; Squire, 2005; Kiili, 2005; Gungormus 2007) and new methods are needed to increase students' self – sufficiency in Science. Therefore, a computer game for the 7th grade is designed to be employed in science lesson and its effect on students' self-sufficiency towards science is examined in this study. In this context, it is thought that this study could meet the shortages determined in literature and could also reveal the effect of using computer games on learning.

METHOD

We drew on quasi – experimental method in this study. This method involves an experimental and a control group but the groups are not assigned randomly. If there is not a meaningful difference in groups' pre-test results, then we can talk about the equality of the groups. The changing scores of both groups from pre-test to post-test are compared and analyzed to see if there is a meaningful difference between the groups (Christensen, 2004).

According to Sonmez (2005), the population and sample must not be an option in experimental researches. Therefore the population generalizability is ignored, and then the study group is determined accordingly. The study group involves 7th graders from seven different schools chosen from each region of Turkey. In this content, while there is no interference to the teaching process in one of the two classes in each school, the other is promoted by the new designed computer game as an additional material. This application proceeded during 2014 – 2015 academic year.

Within the context of the study, the current teaching process was not intervened. The control group's and the experimental group's lessons in each school, are conducted by the same teacher. The computer game designed in parallel with the teaching process was additionally played by the experimental group students. The game is played by three players on-line. 3 players are randomly matched up in login. The game takes place in a laboratory. The main goal of the game is to hunt down the stuffs in the lab. The stuff choice questions come first in the interface of the lab and those consist of multiple-choice questions. The game involves 6 circuits in total. One of the multiple choice questions in active categories in each circuit is chosen by the system randomly and

shown to the players simultaneously. The question is to be answered in a limited time. When all the players answer the questions or the time is up, the “interface of the answer” is shown to the players. Here, the question, options, the right answer, players’ answers and the time of answering the question is displayed. The ones who give the right answer will be able to choose a stuff, from the fastest to give the answer to the last, respectively. The ones that cannot give the right answer will not be able to make a choice, but will be the watchers. They can only see that the player(s) made their choice. Each circuit is completed this way. When the circuits are all completed but there is still a stuff that is not chosen, then comes another step “additional stuff choice” and that will be conducted by the two most successful students. The success rating is determined with the players scores. The actual game starts in this phase. The players make moves one by one to take possession of another’s stuff. 3 questions are asked to the two players, one of whom is the attacker and the other is the owner of the stuff. Here, there may be multiple – choice questions or answers to be guessed by the players. Each question directed in this pace is answered in a limited time. When the questions are answered or the time is up the interface of the answers is displayed to all the players. After answering each question in this way, if the winner (the one to get more points than the other) is the attacker, he/she gets hold of the opponent’s stuff. If the winner is the one who is attacked, his/her stuff stays with him/her and another player takes turn. The game is over when one of the three players captures all the stuffs. The sample scenes from the game are shown in figure 1.

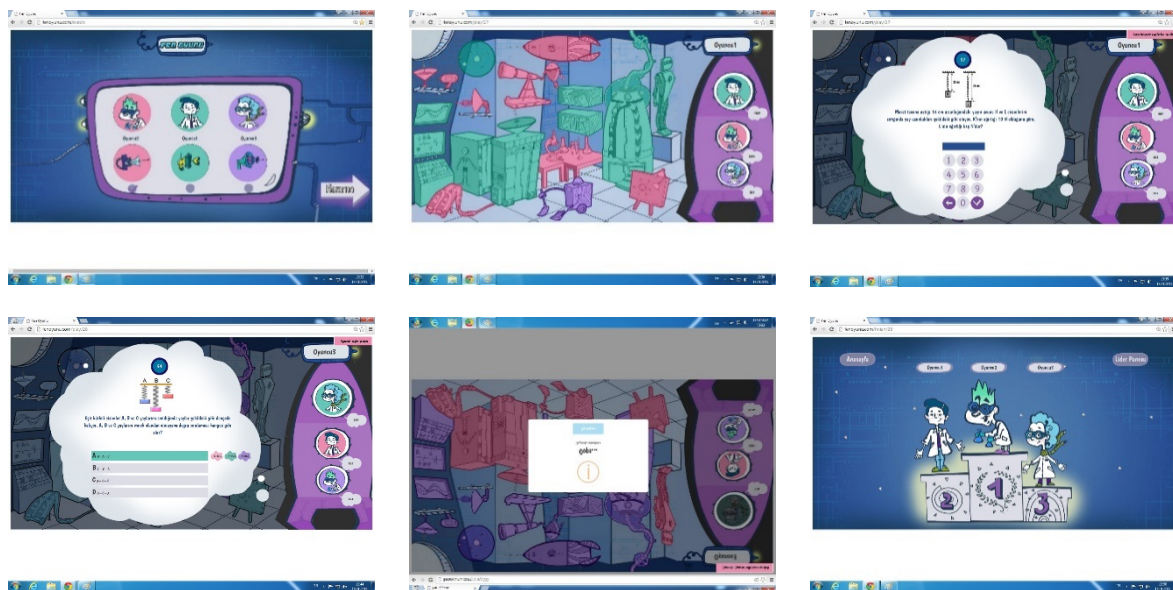


Figure 1. Sample scenes from the science game.

Science lesson self-sufficiency scale developed by Tatar et al. (2009) is used in this study to determine the students’ levels of self-sufficiency in Science and the changes in these levels. The scale is applied to the students two times in total, at the beginning of the first term as a pre-test and at the end of the second term as a post-test. 36 questions in total are prepared in five point likert form in the process of developing the scale. And these questions are asked to 400 students of the 6th, 7th and the 8th grades in 10 primary schools. The scale is dropped to 27 questions as a result of analyzing the data obtained from this investigation and the coefficient of the Croanbach alpha is determined as .93.

FINDINGS

The self-sufficiency scale is applied to all of the groups as a pre-test before and as a post-test after the application and it is checked with the independent t-test if there is a statistically meaningful difference between the groups pre-test and post-test results. The result of the application is demonstrated below;

Table 1: The statistical pre-test and post-test results between the control and the experimental groups of each region

Regions	Application	Group	N	\bar{X}	ss	Sd	t	p
Marmara	Ön Test	Experimental	30	89,87	6,48	58	,391	,698*
		Control	30	90,50	6,07			
	Son Test	Experimental	30	115,07	6,77	58	12,076	,000**
		Control	30	92,47	7,70			
Aegean	Ön Test	Experimental	30	87,83	8,56	59	,487	,628*
		Control	31	86,81	7,90			
	Son Test	Experimental	30	114,80	4,66	59	19,910	,000**
		Control	31	86,32	6,35			
Mediterranean	Ön Test	Experimental	33	84,39	10,81	65	,648	,519*
		Control	34	85,91	8,21			
	Son Test	Experimental	33	113,97	7,48	65	15,750	,000**
		Control	34	84,88	7,63			
Central Anatolia	Ön Test	Experimental	31	86,74	8,54	61	,142	,888*
		Control	32	86,44	8,48			
	Son Test	Experimental	31	116,03	5,42	61	17,935	,000**
		Control	32	85,59	7,80			
Black Sea	Ön Test	Experimental	30	87,13	7,21	59	,476	,636*
		Control	31	88,03	7,52			
	Son Test	Experimental	30	117,40	4,81	59	24,252	,000**
		Control	31	85,84	5,32			
Eastern Anatolia	Ön Test	Experimental	32	75,03	7,57	60	,052	,959*
		Control	30	74,93	7,21			
	Son Test	Experimental	32	103,50	6,39	60	14,593	,000**
		Control	30	76,63	8,06			
Southeastern Anatolia	Ön Test	Experimental	34	71,82	6,62	68	,960	,341*
		Control	36	73,19	5,30			
	Son Test	Experimental	34	105,12	5,59	68	22,737	,000**
		Control	36	75,03	5,49			

*p>.05; **p<.01

When the analysis results are examined, the experimental and the control groups' - chosen from seven regions - pre-test scores of the self-sufficiency scale regarding Science are found to have no meaningful difference. $t_{\text{Marmara}}(58) = 0,391$, $t_{\text{Aegean}}(59) = 0,487$, $t_{\text{Mediterranean}}(65) = 0,648$, $t_{\text{Central Anatolia}}(61) = 0,142$, $t_{\text{Black Sea}}(59) = 0,476$, $t_{\text{Eastern Anatolia}}(60) = 0,052$, $t_{\text{Southeastern Anatolia}}(68) = 0,960$, $p > .05$). When we examine the average scores of pre-tests on the basis of regions, it can clearly be seen that the average scores of the experimental and control groups students in each region are close to each other. That is, we can say that the levels of the control and the experimental groups' students' self – sufficiency in Science before the application is quite close to each other.

And, when we examine the post-test results after the application, we can talk about a meaningful difference between the experimental and the control groups' students' average scores of self- sufficiency scale regarding Science. $t_{\text{Marmara}}(58) = 12,076$, $t_{\text{Aegean}}(59) = 19,910$, $t_{\text{Mediterranean}}(65) = 15,750$, $t_{\text{Central Anatolia}}(61) = 17,935$, $t_{\text{Black Sea}}(59) = 24,252$, $t_{\text{Eastern Anatolia}}(60) = 14,593$, $t_{\text{Southeastern Anatolia}}(68) = 22,737$, $p < .05$). Once again, we see a considerable difference between the experimental and the control group students when we examine the post-test results on the basis of the regions. The experimental groups' students' scores are determined to be higher in comparison to the other groups. In this context, we come to the conclusion that a computer game designed for Science lesson increased the students' levels of self-sufficiency.

DISCUSSION

The recent researches have shown that the primary and the secondary school students have increased the time they spare for the computer games and that the computer games take place on the top among the purposes of using computers (Christakis et al., 2004; Inal and Cagiltay, 2005; Chen et al., 2010). The disadvantageous conditions of the students who are interested in computer games and spend too much time playing computer games can be turned into an advantage by the educational computer games. In this context, the effect of the computer game designed for the 7th grade Science lesson as an additional material for the current teaching

process on students' self-sufficiency was examined to see if there was a meaningful difference between the scores of the students who play the game and who do not.

The post-test results are based on to evaluate the students' self-sufficiency levels regarding Science. We see a meaningful difference between the post-tests of the control and the experimental groups in the same region. That difference can be interpreted in a way that the computer game designed for Science lesson and used as an additional material in experimental groups affects the students' self-sufficiency level in a positive way.

Offering an opportunity to learn by experience, computer games are tools that students can fool around with and carry on their activities individually. They also offer feedbacks directly and make evaluations of right and the wrong answers and make it possible for the students to see their mistakes immediately visually, audibly etc.

When we examine the literature, we find out that the researches in which the computer games have been applied in different ways have come to good results:

The study conducted by Avcı et al. (2009) has shown that the teachers and the students who attended the study liked the computer game promoted lessons very much and that it contributed a lot on students' learning. Tuzun et al.(2009) conducted a research to observe effectiveness of learning some concepts and contents of Math in a 3D multiple-player computer game setting, and came to a conclusion that the newly designed educational computer game could be used as an effective tool in learning the subject "function" and its varieties. They also stated that the significant factors in that effectiveness are the setting's including experimental and inquiry based activities, the high motivation of the students during the application, their having the opportunity to learn at their own speed and the atmosphere that encourages student cooperation.

Donmus (2002) and Kebritchi, Hirumi and Bai (2010) examined the effect of educational computer games on students' motivation in their research. As a result of their study, the computer games are found to have a positive effect on students' motivation, memorability of the subjects and promoting students' achievements. They additionally stated that the computer games must be popularized because they are regarded as tools enriching the teaching in Primary school level.

Many similar researches in literature have shown that the educational computer games have many positive effects on the teaching process of different disciplines. This study which is carried out on students' self-sufficiency towards science share similarity with other studies in the literature. The study fills a gap about the effect of educational computer games on students' self-sufficiency towards science in the literature and shows that along with the other favourable effects, the educational computer game has a positive influence on students' self-sufficiency toward science. Considering the potential of them, computer games are recommended in teaching process to increase the learning capacity of the students and to offer them a better learning environment.

References

- Akkemik, S. (2007). Bilgisayar Oyunu ve Oyuncusu, 20 Şubat 2014 tarihinde http://www.enformatikseminerleri.com/dosyalar/seminer1/oyun_oyuncu_sunum.
- Avcı, Ü., Sert, G., Özdiñç, F. ve Tüzün, H. (2009). Eğitsel Bilgisayar Oyunlarının Bilişim Teknolojileri Dersindeki Kullanım Etkileri. 9. Uluslar Arası Eğitim Teknolojileri Konferansı, 6-8 Mayıs, Ankara.
- Aydiner, B.B. (2011). Üniversite Öğrencilerinin Yaşam Amaçlarının Alt Boyutlarının, Genel Öz-yeterlik, yaşam doyumu ve çeşitli değişkenlere göre incelenmesi. Eğitim Bilimleri Enstitüsü Yayınlanmamış Yüksek Lisans Tezi, Sakarya Üniversitesi, Sakarya.
- Brand, J.E., Knight, S.J. & Majewski, J. (2003). The Diverse Worlds of Computer Games: A Content Analysis of Spaces, Populations, Styles and Narratives. First Level Up Digital Games Research Conference, University of Utrecht, The Netherlands. 21 Şubat 2014 tarihinde, <http://www.digra.org/dl/db/05150.06387.pdf>.
- Chen, H. P., Lien, C. J., Annetta, L. & Lu, Y.L. (2010). The Influence of an Educational Computer Game on Children's Cultural Identities. Educational Technology & Society, 13 (1), 94-105.
- Christakis, D. A., Ebel, B. E., Rivara, F. P. & Zimmerman, F.J. (2004). Television, Video, and Computer Game Usage in Children Under 11 Years of Age. The Journal Of Pediatrics, 145, 652-656.
- Christensen, L., 2004. Experimental Methodology. United States of America: Person Education.
- Doğusoy, B. Ve Ünal, Y (2006), Çok Kullanıcı Bilgisayar Oyunları ile Öğrenme, VII. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi, 6-8 Eylül, Ankara.
- Donmuş, V. (2012) İngilizce Öğrenmede Eğitsel Bilgisayar Oyunu Kullanmanın Erişkiye, Kalıcılığa ve Motivasyona Etkisi. Yüksek Lisans Tezi, Fırat Üniversitesi, Eğitim Bilimleri Enstitüsü, Elazığ.
- Emekli, U. (2002). Bilgisayar Oyunları Tarihi. 22 Mart 2014 tarihinde http://www.merlininkazani.com/codes/review_screen.asp?GID=144&PN=1.

- Erden, E. (2007). Sınıf Öğretmenlerinin Fen Öğretimi Öz Yeterlilik İnançlarının Öğrencilerin Fen Tutumları ve Akademik Başarıları Üzerindeki Etkisi. Yüksek Lisans Tezi, Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü, İzmir.
- Ergün, M. (1980). Oyun ve Oyuncak Üzerine. Milli Eğitim. 102-119.
- Garris, R., Ahlers R. ve Driskell J. E. (2002). Games, Motivation and Learning: A Research and Practice Mode, Simulation & Gaming, 33(4), 441-467.
- Gros, B. (2007). Digital Games in Education: The Design Of Games- Based Learning Environment. Journal Of Research on Technology in Education, 40(1), 23-38.
- Güngörmüş, G. (2007). Web Tabanlı Eğitimde Kullanılan Oyunların Başarıya ve Kalıcılığa Etkisi. Yüksek Lisans Tezi, Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
- Habgood, M.P.H., Ainsworth, S.E ve Benford, S. (2005). Intrinsic fantasy: motivation and affect in educational games made by children. Proceedings of the AIED 2005 Workshop on Motivation and Affect in Educational Software.
- İnal, Y. ve Çağıltay, K. (2005). İlköğretim Öğrencilerinin Bilgisayar Oyunu Alışkanlıkları ve Oyun Tercihlerini Etkileyen Faktörler. Ankara Özel Tevfik Fikret Okulları, Eğitimde Yeni Yönelimler II. Eğitimde Oyun Sempozyumu.
- Kebritchi, M., Hirumi, A. & Bai, H. (2010). The Effects of Modern Mathematics Computer Games On Mathematics Achievement and Class Motivation. Computers & Education, 55, 427-443.
- Kiili, K. (2005). Digital Game-Based Learning: Towards An Experiential Gaming Model. Internet and Higher Education, 8, 13-24.
- Kotaman, H. (2008). Özyeterlilik inancı ve öğrenme performansının geliştirilmesine ilişkin yazın taraması. Uludağ Üniversitesi Eğitim Fakültesi Dergisi, 21(1), 111-133.
- Köseoğlu, F., Atasoy, B., Kavak, N., Tümay, H., Akkuş, H., Kadayıfçı, H., Budak, E., & Taşdelen, U. (2003). Yapılandırmacı öğrenme ortamı için bir fen ders kitabı nasıl olmalı? Ankara: Asil Yayın Dağıtım.
- Özerkan, E. (2007). Öğretmenlerin Öz-Yeterlilik Algıları ile Öğrencilerin Sosyal Bilgiler Benlik Kavramları Arasındaki İlişki. Yüksek Lisans Tezi, Trakya Üniversitesi Sosyal Bilimleri Enstitüsü, Edirne.
- Papastreghiou, M. (2009). Digital Game- Based Learning in High School Computer Science Education: Impact on Educational Effectiveness and Student Motivation. Computers & Education, 52(1), 1-12.
- Pillay, H. (2002). An Investigation of Cognitive Processes Engaged in by Recreational Computer Game Player: Implications for skills of the Future. Journal of Research on Technology in Education 34(3), 336.
- Prensky, M. (2001). Digital game based learning. New York; London; McGraw-Hill.
- Senemoğlu, N. (2004). Gelişim Öğrenme ve Öğretim Kuramdan Uygulamaya. Ankara: Gazi Kitabevi.
- Squire, K. (2005). Changing The Game: What Happens When Videogames Enter The Classroom? Innovate 1(6).
- Sönmez, V. (2005). Eğitim Felsefesi. (7. Baskı). Ankara: Anı Yayıncılık.
- Tatar, N., Yıldız, E., Akpınar, E., ve Ergin, Ö. (2009). A Study on Developing a Self Efficacy Scale towards Science and Technology. Eurasian Journal on Education Research, 36, 263-280.
- Tüzün, H., Yılmaz-Soylu, M., Karakuş, T., İnal, Y., ve Kızılkaya, G. (2009). The Effects of Computer Games on Primary School Students' Achievement And Motivation In Geography Learning. Computers & Education, 52(1), 68-77.
- Ural, N. (2009). Eğitsel Bilgisayar Oyunlarının Eğlendirici Ve Motive Edici Özelliklerinin Akademik Başarıya Ve Motivasyona Etkisi. Doktora Tezi, Anadolu Üniversitesi Eğitim Bilimleri Enstitüsü, Eskişehir.
- Vos, N., van der Meijden, H. ve Denessen, E. (2011). Effects of constructing versus game playing an educational game on students motivation and deep learning strategy use. Computers and Education, 56, 127-137.
- Yağız, E. (2007). Oyun Tabanlı Öğrenme Ortamlarının İlköğretim Öğrencilerinin Bilgisayar Dersindeki Başarıları ve Öz-Yeterlilik Algıları Üzerine Etkileri. Yüksek Lisans Tezi, Hacettepe Üniversitesi Fen Bilimleri Enstitüsü, Ankara.

The Effectiveness Of Using Corpora On Lexical Revision In L2 Writing

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ABSTRACT

This study reports on the results of classroom research investigating the effects of using data-driven learning methods by students in revising their writing errors. The main purpose of the study is to examine to what extent is consulting a corpus effective in correcting lexical errors in their writing. It has been found in previous research that data-driven learning can benefit students in the revision process and that it works better for certain error types (Tono et al, 2014). The targeted error category was lexical errors including formal errors or semantic errors. For the study, a small corpus of 44 student paragraphs written in a timed writing task was used. The corpus of student paragraphs was analyzed for the common lexical errors. The error classification used in the study was drawn from the lexical error taxonomy of James (1998). All lexical errors were hand tagged according to the taxonomy. From among the common errors, certain errors were chosen for revision activities. Students were given hand-on instruction on using an online corpus and its concordancing tools and were asked to revise the selected errors by referring to the corpus. The effectiveness of consulting a corpus while revising errors was compared for different lexical error types.

INTRODUCTION

A corpus is a systematized collection of language data. Generally corpora serve descriptive purposes that is to provide a picture of the subjected language in a selected time frame. Modern computerized corpora consist of large databases of language systematically divided into subgenres. Corpora such as the BNC (British National Corpus) and COCA (Corpus of Contemporary American English) have user friendly interfaces which can be used freely by both researchers and language learners. These corpora have their own built-in concordancing tools which make it easy to conduct searches on various language items. Originally developed for linguistics research purposes, corpora and their concordancing tools have started to attract the attention of language practitioners who have started to use them for teaching purposes. After a short period of training, language learners can become users of these tools and make their own discoveries about the language they are learning. It is believed that corpora provide valuable information about the appropriate and up-to-date use of vocabulary for language learners. Therefore students can benefit from consulting a corpus while revising their writing. Additionally this process could increase their self-confidence as learners and increase their autonomy in learning.

Studies on the effects of corpus use in error correction point to the fact that certain error types are more suitable against checking against a corpus. For example in a recent study with Japanese learners, Tono, Satake, Miura (2014) classified a total of 188 errors into three major categories: ‘omission’, ‘addition’ and ‘misinformation’. Their study revealed significant differences in correction accuracy rates between these three error types. Whereas omission and addition errors were easily identified by learners, misinformation errors were low in correction accuracy.

There is a recent interest in the use of corpora tools, for example the use of learner corpora to facilitate L2 writing. For example Creswell (2007) has evaluated the effectiveness of Data-Driven Learning (DDL) (Johns 1994; Hadley, 2002) on writing achievement. Creswell’s conclusion is that:

DDL...applied in the context of the communicative teaching of writing skills, is moderately effective, and that there is potential both for the further development of learner corpora in an evaluative role, and for use of a wider range of instrumentation. (p. 267)

Additionally, Lee, Shin and Chon (2009) have investigated the effect of corpus consultation on the writing performance of L2 writers. They utilized Concord Writer 2 to help for the lexical revision. Their results point to the positive impact of corpus consultation on L2 writing improvement as well as the ability to notice errors.

THE STUDY

In the light of previous research on the use of corpora as a tool for developing L2 writing, the present study investigated the following questions:

1. Which lexical error types are more frequent in L2 writing by Turkish non-native students?
2. How does the use of BNC as a reference tool affect students' lexical revision process in L2 writing compared to un-aided revision?
3. Is the use of BNC as a reference tool more effective on revision in certain lexical error types than others?

The participants of the study were 44 prep class students at KTU Department of English Language and Literature. The context was a preparatory class writing course where students are trained to write paragraphs and essays following a process approach. The students' English level ranges from intermediate to advanced. All participating students were native Turkish speakers.

A corpus based approach was followed in the study to determine the frequency of lexical errors to be targeted for revision activities. For this purpose, a small scale corpus of student paragraphs was compiled. This paragraph corpus consisted of opinion paragraphs written in a timed-writing task on the following topic: "Discuss the advantages and disadvantages of using a credit card." The resulting paragraph corpus consisted of 44 paragraphs which had 919 word types and 5655 word tokens. The paragraph corpus was hand tagged for lexical errors using an adapted version of James' (1998) error taxonomy. The frequency of errors in different categories were determined by using AntConc 3.2.4. Concordancing software. Figure 1 shows the concordance lines with error tagging displayed by AntConc.

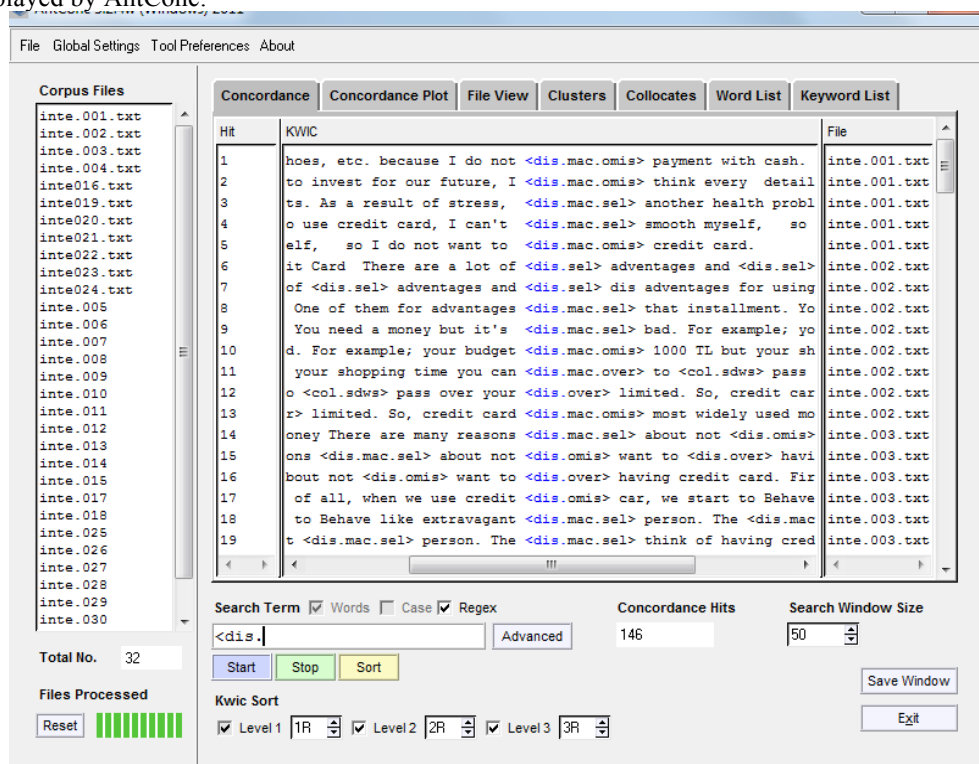


Figure 1. Hand-tagged concordance lines from the paragraph corpus

The BNC was used as a reference tool to aid students' revision process. The BNC website allows you to quickly and easily search the 100 million word British National Corpus (1970s-1993). The BNC was originally created by Oxford University Press in the 1980s - early 1990s, and now exists in various versions on the web. The BNC has its own built in tool which allows users to do searched and analyses. (see Figure 2)

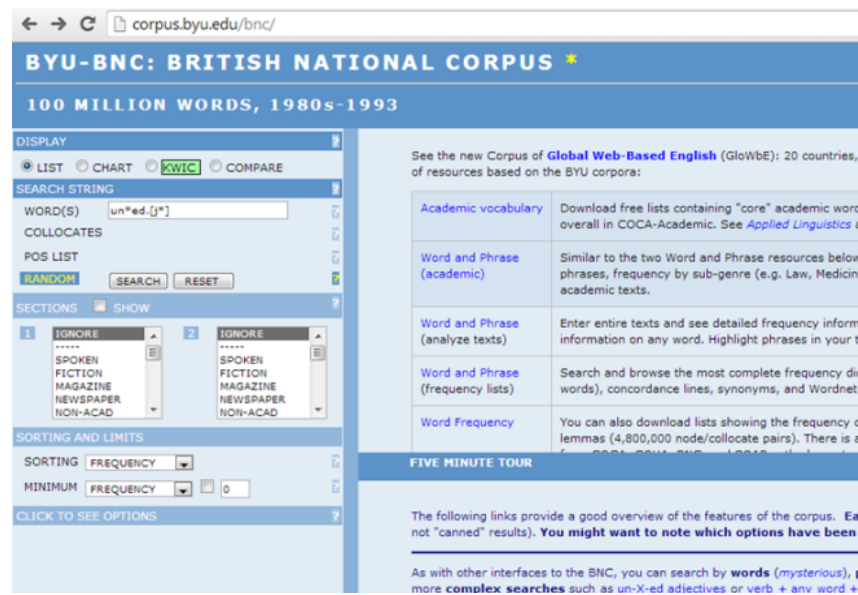


Figure 2. The BNC Corpus User Interface

The error taxonomy used in the study was developed by James (1998) and consists of two main lexical error categories of 'formal errors' and 'semantic errors'. (see Figure 3.) Formal errors category includes 'misselection', 'misformation' and 'distortion' errors. Semantic errors category includes 'confusion of sense relations', 'collocation', 'connotation' and 'stylistic' errors.

A Formal errors	
1 Formal misselection	
1.1	Suffix type
1.2	Prefix type
1.3	Vowel-based type
1.4	Consonant-based type
1.5	False friends
2 Misformations	
2.1	Borrowing (L1 words)
2.2	Coinage (inventing based on L1)
2.3	Calque (translation from L1)
3 Distortions	
3.1	Omission
3.2	Overinclusion
3.3	Misselection
3.4	Misordering
3.5	Blending
B Semantic errors	
1 Confusion of sense relations	
1.1	General term for specific one
1.2	Overly specific term
1.3	Inappropriate co-hyponyms
1.4	Near synonyms
2 Collocation errors	
2.1	Semantic word selection
2.2	Statistically weighted preferences
2.3	Arbitrary combinations
2.4	Preposition partners
3 Connotation errors	
4 Stylistic errors	
4.1	Verbosity
4.2	Underspecification

Figure 3. Lexical Error Taxonomy (James 1998)

As a data collection procedure, a revision task was prepared based on the erroneous sentences chosen from the paragraph corpus. The participating students were randomly divided into an experimental group and control group. Each groups consisted of 10 students. The students in the control group were given a free revision task and were asked to correct the lexical errors depending on their intuitions. The students in the experimental group were given training on using the BNC online concordancing tool and were asked to make revisions after consulting the BNC corpus. In order to determine the correct revision of the incorrect student sentences an

answer key was prepared with the help of a native speaker university teacher with 10 years of teaching experience. The revision task was scored by using the answer key.

FINDINGS

Formal Errors

All lexical error types were hand tagged in the paragraph corpus. After the hand tagging, the frequency of lexical errors were determined by using AntConc. The frequency of lexical errors in different error categories are presented below.

In the formal error category there are three subdivisions: formal misselection, misformation and distortion. Sentence 1.(a) shows an example of a formal misselection mistake, specifically a suffix type error as the adverbial suffix ‘-ly’ has been omitted.

1. (a) All in all, all these disadvantages are the most common examples and if you do not want to come across the bad result of credit cards, you should use it more **<for.suf> cautious**.

Table 1. Frequency of formal misselection errors.

FORMAL MISSELECTION	24
suffix.type	0
prefix type	0
vowel-based type	0
consonant-based type	24
total	

Table 1 shows the frequency of formal misselection errors in the paragraph corpus (n=24). As can be seen from the table, all errors in this category relate to the suffix; either omission of the required suffix or selection of wrong suffix.

Table 2. Frequency of misformation errors.

MISFORMATIONS	0
borrowing	0
coinage	13
calque	13
total	

As the second subdivision of formal errors misformations were determined in the paragraph corpus. The frequency of misformations is presented in Table 2. There are a total of 13 misformations which are categorized as calque (translation from L1). Sentence 1.(b) shows an example of calque error. Here the learner has translated from L1 since in Turkish a password can be ‘solved’, but in English instead of ‘solve a password’, ‘break a password’ is used.

1. (b) A computer hacker could easily **<mis.calq> solve its password** and they could use my credit card more than my limit.

The third subdivision of formal errors is distortion. At the distortion category, the James taxonomy was not found adequate as it only included letter level distortions but not word level distortions. Therefore, distortions were divided into two types: micro-level (those involving letter level distortions) and macro-level (those involving word level distortions). Table 3 shows the frequency of distortion errors both at the micro-level and macro-level. Most frequent type of distortion was found to be omission for both micro-level (n=18) and macro-level (n=38) distortion errors. The second most frequent error type is misselection and at both microlevel (n=12) and macro-level (n=37), however the frequency of macro level errors are higher for all error types.

Table 3. Frequency of distortions

DISTORTIONS	MICRO-LEVEL	MACRO-LEVEL
omission	18	38
overinclusion	10	16
misselection	12	37
misordering	1	14
blending	0	0
total	41	105

Sentence 1.(c) below shows an example of a distortion error at the micro-level, specifically an omission since a letter has been omitted when writing ‘because’ by the learner.

1. (c) To sum up, people should not use credit cards <dis.omis> becuse of these reasons.

Sentence 1. (d) below shows an example of a macro-level distortion, specifically a macro-level omission. Here the word ‘become’ has been omitted from the phrase ‘become addicted to’.

1. (d) Moreover they <dis.mac.omis> addict to <for.suf> use credit cards.

Semantic Errors

In the semantic errors category there are only 8 errors in the confusion of sense relations error subdivision. 5 of these errors relate to using a general word for a restricted meaning. And 3 of the errors relate to using two near synonyms redundantly in the same sentence.

Table 4. Frequency of confusion of sense relations

CONFUSION OF SENSE RELATIONS	
superonym for hyponym	5
hyponym for superonym	0
inappropriate co-hyponym	0
near synonym	3
total	8

Sentence 2. (a) below shows an example of near synonym error. I the sentence both unnecessary and extra have been used redundantly because both have very similar meanings.

2. (a) Secondly, when I use credit card, I have to pay its interest and what I say is that I pay <sem.near> unnecessary extra money.

When we consider collocation errors, we can see that the most frequent error type is semantically determined word selection. There are a total of 17 errors in this category. In terms of collocations learners also seem to have some difficulty in selecting the correct preposition partner for words, therefore there are 14 errors in the preposition partners category. In terms of arbitrary combinations there are only 3 errors detected.

Table 5. Frequency of collocation errors

COLLOCATION ERRORS	
semantically determined word selection	17
statistically weighed preferences	0
arbitrary combinations	3
preposition partners	14
total	34

Sentence 2. (b) shows an example of a semantically determined word selection error. Here the learner has used the word suicide as if it were a verb, however this word has a verb which closely collocates with it. This word is 'commit' but the learner has omitted the collocation.

2. (b) Meanwhile, there are a lot of <dis.mac.sel> person who <col.sdws> suicide .

Figure 3 shows the overall distribution of the error frequencies in the paragraph corpus. According to this distribution the most common error type is macro-level distortion errors, and the least frequent error type is confusion of sense relations. Overall formal errors are much higher in frequency compared to semantic errors.

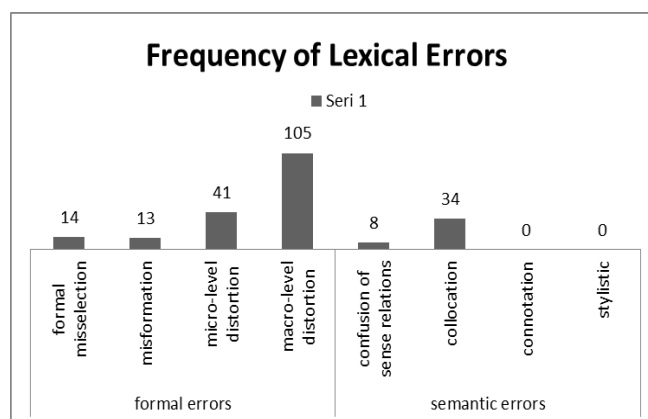


Figure 3. Frequency of all lexical error types

Comparison of Revision Accuracy Between Experimental and Control Group

At the last step of the study, the accuracy of revision were compared between the experimental and control groups through the completion of a revision task. Table 6 shows the accurate correction rates of distortion errors under the category of formal errors. According to the results, in this error category the corpus aided group (M: 80) performed better than the free correction group (M=52). The experimental group correctly revised 4 errors out of 5 errors; whereas the control group correctly revised 2,6 errors out of 5.

Table 6. Comparison of experimental and control group in terms of revision accuracy of formal misselection errors

Part A	Corpus aided correction	%	Free correction	%
	3	60	1	20
	3	60	3	60
	4	80	3	60
	3	60	2	40
	4	80	4	80
	5	100	3	60
	4	80	3	60
	5	100	2	40
	5	100	4	80
	4	80	1	20
average	4	80	2,6	52

Table 7 shows the revision accuracy rates of the experimental and control groups in different error categories. According to the overall results, in all lexical error categories, the learners scored higher in terms of revision accuracy. Among these, learners in the experimental groups were most successful in revising the formal misselection errors, followed by distortions and semantic errors.

Table 7. Overall comparison of revision accuracy between experimental and control group

Success in correction rates	CAC*	FC**
	%	%
Formal misselection	80	52
Misformations	46,67	22
Distortions	73,33	52
Semantic errors	46,67	26
Collocation errors	60	44
Total	61,33	39,2
*Corpus aided correction		
** Free correction		

CONCLUSION

This study served to two main purposes: first determining the frequent lexical errors in student writing and second determining which error types are more suitable for revising with the help of a corpus tool. As a result of the study, it was found that L2 writers make most frequent lexical errors in the formal error category and most frequent of these errors are micro-level and macro-level distortions. In the semantic error category, the most frequent error type is collocation errors. These results show that Turkish L2 writers have most difficulty in selecting appropriate words contextually and also they have a lack of knowledge about collocation use.

The second research question investigated was the effect of BNC corpus as a reference tool in revising lexical errors in L2 writing. The results of the study shows that the BNC corpus serves as an effective tool which helps L2 writers greatly in revising their lexical errors compared to intuitive judgements. Although they can make accurate revisions to some extent depending on their intuitions, the level of accuracy is very low compared to corpus aided revision.

The third research question specifically enquired which error types are most suitable for revising with the use of a reference corpus. As an answer to this question, the revision accuracy rates show that most accurate revisions were done for formal misselection errors, distortions and collocations. On the other hand, the L2 writers have not benefited from reference corpus in revising misformation errors and semantic errors. Overall, these results point to the importance of corpus use and concordancing as an effective tool in helping L2 writers in revising their lexical errors, specifically related to contextual vocabulary selection and collocations. As an implication, the researchers greatly recommend the use of corpus tools and reference corpora as an aid in second language writing classes.

References

- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.) Sage Publications, Thousand Oaks CA
- Hadley, G. (2002). An introduction to data-driven learning. *RELC journal*, 33(2), (pp. 99-124).
- James, C. (1998). *Errors in language learning and use*. White Plains, NY: Addison-Wesley Longman.
- Johns, T. (1994). *From printout to handout: Grammar and vocabulary teaching in the context of Data-driven Learning*. Perspectives on pedagogical grammar, (pp. 293-309).
- Lee, M., Shin, D., & Chon, Y. V. (2009). Online corpus consultation in L2 writing for in-service teachers of English. *영어교육*, 64(2).
- Tono, Y., Satake, Y., & Miura, A. (2014). The effects of using corpora on revision tasks in L2 writing with coded error feedback. *ReCALL*, 26(02), (pp. 147-162).

The Effects Of Using Narrative And Informative Texts In Turkish Lessons On Writing Skills And Attitude To Tree And Environment

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ABSTRACT

In this research it is aimed to determine the effects of using narrative and informative texts in Turkish lessons on students' writing skills and attitude to tree and environment. The universe of the study consists of 4th grade students attending to primary schools in the city of Kütahya in 2014-2015 school year. The sample of the study is formed a total of 84 primary school fourth grade students who have been selected randomly among the schools that show similar characteristics in terms of socio-economic level. Semi-experimental design was used in this study. Two of the groups have been identified as the experimental and one of them is identified as the control group. The process of experiment is organized according to the Turkish language teaching program for Health and Environment theme. Four texts were used in both experimental group and control group. The texts used in the experimental groups were selected in terms of suitability of the level and the themes in accordance with expert opinion. In experiment-1 group only narrative texts and in experiment-2 group only informative texts were used. Activities of experimental groups were organized similar to the activities of control group in accordance with expert opinion. In the lessons of the control group, texts located in the Turkish textbooks are used. In the research as a data collection tool an Attitude Scale towards Tree and Environment developed by Kunt (2013); and a Scoring Scale Key for Writing Assessment developed by Uygun (2012) were used. As in the scope of research all groups wrote a composition about the environmental pollution and an Attitude Scale Towards Tree and Environment was applied as a pre-test and post-test. As the data don't show a normal distribution, in the analysis of data it is benefited from Mann-Whitney U and Kruskal Wallis tests. Besides Experiment-1 group in which only the narrative texts were used in the lessons scored statistically high in the Scoring Scale Key for Writing Assessment than the other groups. There wasn't a significant difference between the scores of experiment-2 group in which only the informative texts were used during the lessons and the control group in the Scoring Scale Key for Writing Assessment. According to the findings of the research it is suggested to include much more narrative texts in 4th grade Turkish lessons.

Key words: Narrative text, Informative text, Composition writing skills, Attitude to tree and environment

1. INTRODUCTION

One of the four main language skills, writing is among the most important types of expression. Writing is a means of expressing emotions, thoughts and experiences within certain linguistic rules in an original manner. Therefore, writing requires the use of higher mental skills and interpretation of the information to be written (Gülyüz, 2006). Writing enables the individual to interact with others, to express himself/herself, to seek for information, to develop imagination, to define thoughts and phenomena, to record past events, to change others' behaviors, to communicate and to imagine (Smith, 2005). According to Sharples (2003), writing entails not only expressing ideas but also establishing communication or expressing these ideas so properly that people can be aroused and excited. With developing writing skill, students can produce higher level writings. They get away from writing format based on the transfer of information, that is a kind of copying and they generate their own writing style by interpreting their acquired information (Akyol, 2006).

During primary school period, students usually encounter narrative, informative and poetic texts. In narrative texts, the writer narrates interrelated incidences from a specific point of view by indicating space and time in a fictional manner (Coşkun, 2007). There are two main types of narration. In one of them real events are told and in the other one, imaginary events are told. On the other hand, these two types of narration can be used in combination. For instance, historical novel is a fictional narration but it may also include historical information and documents from real life. Narration can be seen in different types of texts. Narration can be used in a letter, a play or a poem (Akbaş, 2010). Children's stories affect children as they address the issues from the real lives of children, are built on lively, colorful and poetic expression and responsive to their expectations and realities (Gökçe ve Sis, 2011: 1927). The most prominent characteristic of narration is the existence of an event. This event lays the basis of the narration. By means of the event, ideas are expressed and the reader is informed. Another important characteristic of narration is space and time. The better the setting and time of the event is

expressed, the more effective the narration will be. Setting and time of the event may alter during the narration (Karadağ, 2011; Kolaç, 2009; Gülerüz, 2006).

Informative text is a writing in which a real event, situation or process is explained or defined (Fox, 2009). It is written to give information (Dodson, 2000). Informative texts have a different structure from narrative texts. Though they do not have one agreed structure, researchers determined five main characteristics of it. These are definition, problem solving, chronological ordering, comparison and contrast and cause and effect relationship (Akyol, 2010). Due to their structure, comprehension of information texts is more difficult than narrative texts (Akyol, 2010; Williams, 2005).

In the current study, the purpose was to determine the effect of the use of narrative and informative texts in Turkish language course on students' composition writing skills and attitudes towards the consciousness of tree and environment. As the research process was structured according to the theme of *Health and Environment* and the selected texts heavily included topics related to the consciousness of tree and environment, the study investigated whether the students' attitudes towards the consciousness of tree and environment changed or not.

2. METHOD

2.1. Model of the study

The current research employed a quasi-experimental pretest-posttest control group design. The quasi-experimental design is used in situations where experimental group participants and control group participants are not assigned randomly (Fraenkel and Wallen, 2003). In some situations, it might be impossible to randomly assign the participants into experimental and control groups or this may not be desired. In such situations, the quasi-experimental design can be used. In this design, random distribution is not used and effort is not made to construct groups through random assignment. Instead, one or more of the groups previously constructed through a method different from random assignment are selected as control and experimental groups. However, great care is taken for the members of the groups to be as much similar as possible (Gay, 1996; McMillan and Schumacher, 2006).

2.2. Study Group

The study group of the current research consists of 84 elementary school 4th graders random selected from three different elementary schools located in the city of Kütahya. Experimental-1 Group is comprised of 14 girls and 15 boys, totally 29 students; Experimental-2 Group is comprised of 12 girls and 16 boys, totally 28 students and the control group consists of 13 girls and 14 boys, totally 27 students. It can be told that the distribution of the experimental and control groups students according to total number of students and gender is similar.

In order to make the groups equal to each other, their marks from Turkish language course were compared. For this purpose, Kruskal-Wallis test was run. Findings obtained from Kruskal-Wallis test are given in Table 1.

Table 1: Comparison of the Groups' Marks from Turkish Language Course

Group	N	Mean Rank	Sd	χ^2	p
Experimental-1 Group	29	38,71	2	1,803	,406
Experimental-2 Group	28	47,25			
Control Group	27	41,65			

As can be seen from Table 1, there is no significant difference between the students' marks from Turkish Language course [$\chi^2_{(2)} = 1,803$; $p > ,05$]. This shows that the groups are equal to each other in terms of their marks from Turkish language course.

2.3. Data Collection Instruments

In the present study, a personal information form and two data collection instruments were used. With the personal information form, information about the gender of the students and their marks from Turkish language course was gathered. In order to elicit the students' attitudes towards tree and environment before and after the application, the 29-item *Tree and Environment Attitude Scale* developed by Kunt (2013) was used. The scale is in the form of five-point Likert type ranging from *Strongly Agree*, *Agree*, *Undecided*, *Disagree*, *Strongly Disagree*. All the items in the scale are positive statements. The possible lowest score to be taken from the scale is 29 and the highest score is 145. Cronbach alpha value of the scale calculated during its development is .81. The scale is a 6-factor scale explaining 60% of the total variance. Its Cronbach alpha value calculated in the current study is .81.

For the evaluation of the compositions written by the students before and after the application, *Graded Scoring Key for Evaluating Written Composition* developed by Uygun (2012) was employed. In this scoring key there are 12 items and these items are scored as 1, 2, 3. The possible lowest score to be taken from the scoring key is 12 and the highest score is 36. During the process of developing the graded scoring key, opinions of the five field experts and three classroom teachers were sought to establish the validity of the scoring key. The items in the graded scoring key were linguistically rearranged under the supervision of two linguistic experts. For the reliability study for the graded scoring key, 48 elementary school five graders were made to write narrative and informative texts. These texts were scored separately by three field experts. Then inter-rater reliability was calculated. To establish the inter-rater reliability Kendall fit coefficient was calculated as the number of raters is higher than two and it was found to be $W=.83$. This shows that there is a high level of agreement between the raters.

2.4. Application Process

Before the application, the experimental and control groups students were asked to write compositions with the topic of *Tree and Environment* as a pretest. Moreover, they were administered *Tree and Environment Attitude Scale*. During the application process, the texts to be used with the experimental groups were determined through expert opinions in terms of their compliance with the theme of Health and Environment and grade level. After the determination of the texts, the activities to be used in the experimental groups were prepared in a similar manner to the activities in the Turkish Language text book that would be used with the control group. Based on the expert opinions, some changes were made.

In the classes where the experimental groups were taught, only narrative texts were used in the Experimental -1 Group and only informative texts were used in the Experimental-2 Group. The lessons in the experimental groups were conducted by the researcher. In the control group, there was no intervention. The lessons in the experimental groups were planned as 2 class hours per week and thus totally 16 class hours. Pretest and posttest administrations were not included in this time period. At the end of the application period, all the groups were made to write compositions with the topic of *Tree and Environment* and administered *Tree and Environment Attitude Scale*.

2.5. Data Analysis

The compositions written by the students as pretest and posttest were separately scored by the researchers by using the *Graded Scoring Key for Evaluating Written Composition*. The inter-rater agreement was calculated through Pearson correlation coefficient and found to be .96. The obtained correlation coefficient was found to be quite high. A computer-assisted statistics program was used in the analysis of the scores taken from the compositions written by the students and *Tree and Environment Attitude Scale* administered as pretest and posttest. As the scores taken by the students from the scales did not exhibit a normal distribution, non-parametric statistic tests were used in the analysis.

3. FINDINGS

Kruskal-Wallis test was used to investigate whether there is a significant difference between the scores taken by the groups from the compositions written before the application. The obtained findings are presented in Table 2.

Table 2: Comparison of the Groups' Composition Pretest Scores

Group	N	Mean Rank	Sd	χ^2	p
Experimental-1 Group	29	42,34	2	,013	,994
Experimental-2 Group	28	42,25			
Control Group	27	42,93			

As can be seen in Table 2, there is no significant difference between the pretest scores of the groups taken from the compositions [$\chi^2_{(2)}= ,013$; $p> ,05$]. The results show that the groups were equal to each other in terms of their composition writing skills.

Kruskal-Wallis test was used in order to investigate whether there is a significant difference between the groups' attitudes towards tree and environment before the application. The obtained findings are presented in Table 3.

Table 3: Comparison of the Groups' Tree and Environment Attitude Pretest Scores

Group	N	Mean Rank	Sd	χ^2	p
Experimental-1 Group	29	48,34	2	2,996	,224
Experimental-2 Group	28	41,57			
Control Group	27	37,19			

The results presented in Table 3 show that there is no significant difference between the groups' pretest attitude scores [$\chi^2_{(2)} = 2,296$; $p > ,05$]. Thus, it can be told that the groups had similar attitudes towards tree and environment before the application.

Kruskal-Wallis test was used to investigate whether there is a significant difference between the scores taken by the groups from the compositions written after the application. The obtained findings are presented in Table 4.

Table 4: Comparison of the Groups' Composition Posttest Scores

Group	N	Mean Rank	Sd	χ^2	p
Experimental-1 Group	29	53,14	2	8,559	,014*
Experimental-2 Group	28	36,05			
Control Group	27	37,76			

As can be seen in Table 4, there is a significant difference between the groups' composition posttest scores [$\chi^2_{(2)} = 8,559$; $p < ,05$]. In order to determine the source of this significant difference, pair-wise comparisons were made with Mann-Whitney U test. This analysis revealed that the difference is between the Experimental-1 Group and the others. Thus, it can be claimed that composition writing skills of the students using narrative texts in Turkish language classes develop more effectively.

Kruskal-Wallis test was used in order to investigate whether there is a significant difference between the groups' attitudes towards tree and environment after the application. The obtained findings are presented in Table 5.

Table 5: Comparison of the Groups' Tree and Environment Attitude Posttest Scores

Group	N	Mean Rank	Sd	χ^2	p
Experimental-1 Group	29	49,12	2	4,553	,103
Experimental-2 Group	28	42,66			
Control Group	27	35,22			

When the data presented in Table 5 are examined, it is seen that there is no significant difference between the posttest attitude scores of the groups [$\chi^2_{(2)} = 4,553$; $p > ,05$]. This may be because of the shortness of the application period. This might not have been long enough to change students' attitudes.

Composition pretest and posttest comparison of the groups was performed through Wilcoxon signed ranks test. The obtained results are presented in Table 6.

Table 6: Groups' Composition Pretest-Posttest Wilcoxon Signed Ranks Test

Group	Pretest-Posttest	N	Mean Rank	Sum Rank	Z	p
Experimental -1 Group	Negative Rank	2	12,00	24,00	-3,983	,000*
	Positive Rank	25	14,16	354,00		
	Equal	2				
Experimental-2 Group	Negative Rank	8	12,69	101,50	-,832	,405
	Positive Rank	14	10,82	151,50		
	Equal	6				
Control Group	Negative Rank	7	12,07	84,50	-1,117	,264
	Positive Rank	14	10,46	146,50		
	Equal	6				

When the data presented in Table 6 are examined, it is seen that there is a significant difference between the pretest composition scores and posttest composition scores of the Experimental-1 Group. There is no significant difference between the pretest and posttest composition scores of the Experimental-2 Group and Control Group. Thus, it can be claimed that narrative texts are more influential on the development of students' composition writing skills.

The comparison of the groups' pretest and posttest tree and environment attitude scores was carried out with Wilcoxon signed ranks test. The obtained data are presented in Table 7.

Table 7: Groups' Tree and Environment Attitude Pretest-Posttest Wilcoxon Signed Ranks Test Results

Group	Pretest-Posttest	N	Mean Rank	Sum Rank	Z	p
Experimental -1 Group	Negative Rank	7	13,71	96,00	-1,290	,197
	Positive Rank	16	11,25	180,00		
	Equal	6				
Experimental-2 Group	Negative Rank	8	9,19	73,50	-1,461	,144
	Positive Rank	13	12,12	157,50		
	Equal	7				
Control Group	Negative Rank	7	7,00	49,00	-1,663	,096
	Positive Rank	11	11,09	122,00		
	Equal	9				

The results of the Wilcoxon signed ranks test presented in Table 7 show that there is no significant difference between the groups' pretest and posttest attitude scores. This may be because the application period was not long enough to change the students' attitudes.

4. CONCLUSION

It was found that there is no significant difference between the scores taken by the groups from the compositions written before the application but there is a significant difference between the scores taken from the compositions written after the application. This difference is seen to be favoring the experimental group using narrative texts. This indicates that the use of narrative texts in Turkish language courses is more effective in terms of enhancing students' composition writing skills. According to Hall, Sabey and McClellan (2005), students experience some difficulties in connection with informative texts in early years of their schooling. Especially during elementary school years, due to their lack of cognitive experience and cognitive developmental level they experience some problems in understanding informative texts. Yıldırım, Yıldız, Ateş and Rasinski (2010) reported that elementary school fifth graders demonstrate better reading and listening comprehension in narrative texts than informative texts. Başaran and Akyol (2009) found that there is no significant difference between elementary school fifth graders' attitudes towards narrative and informative texts. Moreover, it was found that the students understood the narrative texts better than the informative texts. Similar results have been obtained for different grade levels (Yıldız, 2008; Temizyürek, 2008). In light of the findings reported in the literature, it can be claimed that the improvement seen in the composition writing skill of students stems from their better comprehension of narrative texts.

One of the variables investigated within the context of the current study is students' attitudes towards tree and environment. Pretest and posttest scores revealed that there is no significant difference between the students' attitudes towards tree and environment. The application was found to be ineffective in changing the attitudes of both the experimental groups and the control group. This may be because the application period was not long enough to change the students' attitudes.

In light of the findings of the current study, following suggestions can be made:

- The effect of text types on students' composition writing skills can be determined by similar studies that can be conducted at different grade levels and within a longer time period.
- The effect of text types on students' attitudes towards any issue can be determined in longitudinal studies.
- More emphasis can be given narrative texts in Turkish language classes especially at elementary school level.

References

- Akbayır, S. (2010). *Yazılı anlatım/Nasıl yazabilirim?*. Ankara: Pegem Akademi.
- Akyol, H. (2006). *Türkçe öğretim yöntemleri*. Ankara: Kök Yayıncılık.
- Akyol, H. (2010). *Yeni programa uygun türkçe öğretim yöntemleri*. (3. Baskı). Ankara: Pegem Akademi.
- Akyol, H. ve Başaran, M., (2009). Okuduğunu anlama ve metne karşı geliştirilen tutum üzerinde metnin bilgi verici veya hikâye edici olmasının etkisi. *Uşak Üniversitesi Sosyal Bilimler Dergisi*, 2(1), 11-23
- Coşkun, E. (2007). Yazma eğitimi. A. Kırkkılıç ve H. Akyol, (Ed.), *İlköğretimde Türkçe Öğretimi* içinde (49-91). Ankara: Pegem A Yayıncılık.
- Dodson, L. E. (2000). *The effects of using technology to enhance student ability to read, organize and write informative text*. Unpublished master thesis, University of Manitoba, Manitoba, Canada.
- Fox, E. (2009). The role of reader characteristics in processing and learning from informational text. *Review of Educational Research*. 79(1), 197-261.

- Fraenkel, J. R. and Wallen, N. E. (2003). *How to design and evaluate research in education*. (5th ed.). Boston: McGraw Hill.
- Gay, L. R. (1996). *Educational research competencies for analysis and application*. New Jersey, NJ: Prentice-Hall, Inc.
- Gökçe, B. ve Sis, N. (2011). Gülden Dayıoğlu'nun çocuk öykülerinin "hikâye haritası" yöntemine göre incelenmesi ve genel bir değerlendirme. *Turkish Studies – International Periodical For The Languages, Literature and History of Turkish or Turkic*, 6(3), 1925 – 1949.
- Güleryüz, H. (2006). *Yaratıcı çocuk edebiyatı*. Ankara: Pegem A Yayınları.
- Hall, K. M., Sabey, B. L. and McClellan, M. (2005). Expository text comprehension: Helping primary-grade teachers use expository texts to full advantage, *Reading Psychology*, 26, 211-231.
- Karadağ, Ö. (2011). Yazma eğitiminde anlatım tarzları ve öğretimi. M. Özbay, (Ed.), *Yazma Eğitimi içinde* (147-177). Ankara: Pegem Akademi.
- Kolaç, E. (2009). İlköğretim türkçe ders kitaplarında yer alan metinlerin tür açısından değerlendirmesi. *Uluslararası İnsan Bilimleri Dergisi*, 6(1), 594-626.
- Kunt, H. (2013). Ağaç ve çevreye yönelik tutum ölçeği geliştirilmesi, *Dumlupınar Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 38: 253-262.
- McMillan, J. H. ve Schumacher, S. (2006). *Research in education: Evidence-based inquiry*. (6th Edition). London, UK.
- Sharples, M. (2003). *How we write: writing as creative design*. London: Routledge.
- Smith, H. (2005). *The writing experment*. Australia: AllenveUnwin.
- Temizyürek, F. (2008). The impact of different types of texts on Turkish language reading comprehension at primary school grade eight. *Eurasian Journal of Educational Research*, 30, 141-152.
- Uygun, M. (2012). *Öz Düzenleme Stratejisi Gelişimi Öğretiminin Yazılı Anlatıma, Yazmaya Yönelik Öz Düzenleme Becerisine, Kalıcılığa ve Tutuma Etkisi*. Yayınlanmamış Doktora Tezi, Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.
- Yıldırım, K., Yıldız, M., Ateş, S., ve Rasinsky, T. (2010). İlköğretim beşinci sınıf Türk öğrencilerinin metin türlerine göre okuduğunu ve dinlediğini anlama düzeyleri. *Kuram ve Uygulamada Eğitim Bilimleri/Educational Sciences: Theory & Practice*, 10(3), 1855-1891.
- Yıldız, M. (2008). İlköğretim beşinci sınıf öğrencilerinin dinlediğini anlama düzeylerinin metin türleri bakımından karşılaştırılması. VII. Ulusal Sınıf Öğretmenliği Eğitimi Sempozyumu, 2-4 Mayıs 2008, Çanakkale.
- Williams, J. P. (2005). Instruction in reading comprehension for primary-grade students: A focus on text structure. *The Journal of Special Education*, 39(1), 6-18.

The Examination Of Mental Rotation Abilities Of Elementary Mathematics Education And Mathematical Engineering Students

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ABSTRACT

Mental rotation ability is one of the components of spatial ability. The purpose of the study is to investigate whether there is a difference between the mental rotation skills of elementary mathematics teacher candidates and mathematical engineering students. Elementary mathematics education students from Faculty of Education and mathematical engineering students from Faculty of Chemical and Metallurgical Engineering in the 1st, 2nd and 3rd grade attended to study from a public university. Mental rotation test developed by Sezen Yüksel (2013) was used as data collection tool. The study is a case study and the data obtained from the research were analyzed by a statistics program. The results indicated that there is statistically significant mean difference between mathematics teacher candidates and mathematical engineering students with respect to mental rotation ability. Elementary mathematics education students' mental rotation test scores were higher than mathematical engineering students. Also, comparisons were used at each grade level.

Keywords: Mental rotation ability, elementary mathematics education students, mathematical engineering students

INTRODUCTION

Spatial ability is important in STEM (Science, Technology, Engineering and Mathematics) fields (Battista, 1990; Kayhan, 2005). Spatial thinking is also vital for many occupational groups apart from mathematicians, such as engineers, architects, sculptors, and physicists (Olkun, 2003; Tekin, 2007). There is a great consensus about the importance of spatial ability among researchers. However, in making the definition of spatial ability, different opinions are existed. D'Oliveira (2004) states the reasons why several definitions exist that different researchers describe spatial ability in different ways, there are a number of different components and their different names and different explanations about which spatial ability tests measure which spatial component are available.

When examining the literature the concepts of spatial thinking, spatial perception, and spatial reasoning are used instead of spatial ability (Clements and Battista, 1992; NCTM, 2000; Olkun, 2003). Examples of definitions used in the framework of spatial ability are as follows:

Lord (1985) defined the spatial ability as the ability of creating the image in the mind, changing that image and using it. Linn and Petersen (1985) made this definition about the spatial ability: a general name given to the abilities of presenting, generating, rotating and renaming symbolic and nonverbal information.

This ability is defined by Stockdale and Possin (1998) as understanding the spatial relationship between people and the objects in their environment. Olkun (2003) states that spatial ability is combination of some skills such as visualizing 2D and 3D geometric objects in the mind, rotating them and interpreting their movements. According to Yıldız (2009), spatial ability is identified as imagining the objects in space mentally, recognizing them from different perspectives, moving it bodily or separately.

The number of these definitions can be increased but it can be said that there are common features when examining them about spatial ability. These are abilities of visualizing 2D and 3D components of an object, manipulating, rotating and moving, recognizing from different perspectives, understanding the relationships among objects.

There are also different definitions related to the components of the spatial ability. We can express some of the researchers who recognized mental rotation ability as a component of the spatial ability and some definitions identified by them as follows:

Maier (1996) identified five main components of spatial ability: spatial perception, visualization, mental rotation, spatial relations, and spatial orientation. Linn and Petersen (1985) categorized spatial ability into three components: spatial perception, mental rotation, and spatial visualization. Researcher defined mental rotation ability as the ability to rotate an object in two and three-dimensional space quickly and rapidly.

Karaman (2000) stated that mental rotation is the ability to imagine the appearance of objects from different

perspectives according to one's own position.

With these studies we can summarize the mental rotation ability's features as to imagine the views of an object from different perspectives in two and three-dimensional space.

Studies related to spatial ability appears on the year of 1940s and 1950s (Ünal, 2005). In addition, different studies on pre-service teachers' spatial skills are available. (e.g., Güven and Kösa, 2008; Dursun, 2010; Turgut, 2010; Uygan, 2011).

Güven and Kösa (2008) carried out their study with pre-service mathematics teachers. After some applications were implemented by using Cabri 3D software, at the end of the study students' spatial ability test scores were significantly increased. According to their results computer aided activities provided to development of pre-service mathematics teachers' spatial ability.

In his study Dursun (2010) examined total of 1007 elementary pre-service teachers' (elementary mathematics teachers, elementary science teachers, preschool teachers) spatial visualization abilities, self-efficacies for geometry and spatial concerns in terms of gender and continuing the program. The results showed that spatial visualization scores of elementary mathematics education students are significantly higher than other departments.

In his PhD thesis Turgut (2010), it was investigated there was a relationship between elementary mathematics pre-service teachers' spatial ability and gender, geometric thinking levels, academic achievement, and linear algebra course achievement. According to obtained findings, there was no significant relationship between spatial ability and gender and geometric thinking level but a moderate positive relationship was found between spatial ability and linear algebra course achievement and academic achievement. Uygan (2011) examined the effects of Google SketchUp and concrete model supported applications to spatial ability and pre-service teachers' opinions about the implementation were asked. According to the results pre-service teachers thought Google SketchUp applications were most effective tools in the development of spatial ability and teaching of solids.

There have been studies about examining the spatial ability of faculty of engineering students. Alias, Black and Gray (2002) examined the effect of instructions on spatial visualization ability in civil engineering students. 29 students in treatment group and 28 students in control group from Malaysian Polytechnics attended to the study. After spatial instructions, students' spatial ability test scores increased in the treatment group.

There are studies that examined students' spatial abilities of elementary mathematics education in terms of various variables but no study that compares them with mathematical engineering students is available. It is worthwhile to develop the engineering students' spatial abilities. Therefore via this study, their mental rotation abilities in their grade levels will be analyzed and information about the current situation will be acquired. In addition, thanks to the research the opportunity to compare the education faculty and engineering faculty students' a component of the spatial ability is provided.

In line with the above, three research questions guided the study:

1. Is there any significant difference between the mental rotation test scores of elementary mathematics education students and mathematical engineering students?
2. Is there any significant difference in mental rotation test scores in each department according to their grade levels?
3. Is there any significant difference in mental rotation test scores in the same grade levels according to departments?

METHODOLOGY

This research that examined and compared mental rotation ability of elementary mathematics pre-service teachers and mathematical engineering students was a quantitative study and survey model was used. Survey models try to reveal existing circumstances and conditions as they are. To reach a judgment about the universe in general, research is done on samples taken from a group or the whole universe (Karasar, 2007).

Participants

The sample of the research consists of 84 pre-service teachers who were enrolled in the Department of Elementary Mathematics Education and 137 undergraduate students from Department of Mathematical Engineering at Yildiz Technical University in Turkey during 2014-2015 academic periods. The distribution of the students according to their departments is shown in Table 1.

Table 1. The distribution of the students participating in the study

	Freshmen	Sophomore	Junior	Total
Elementary Mathematics Education	34	26	24	84
Mathematical Engineering	69	46	22	137
Total	103	72	46	221

A total of 221 students were included in analyses. 84 undergraduate students were from Education Faculty in the

Department of Elementary Mathematics Education (34 freshmen students, 26 sophomore students and 24 junior students) and 137 undergraduate students were from Faculty of Chemical and Metallurgical Engineering in the Department of Mathematical Engineering (69 freshmen students, 46 sophomore students and 22 junior students). The reason why there were fewer students from faculty of education was that the number of students taken to the faculties at the end of the university exam was different.

Data Collection Tool

Mental-rotation performance was measured by “mental rotation test (MRT)” developed by Sezen Yüksel (2013). The test was developed within her PhD thesis by researcher and necessary permissions were taken from her before applying the test. There were 32 multiple-choice questions in the test. At the beginning of the mental rotation test, an object was given as an example and left, top and front views of the shape after rotating by 90° around x, y and z axis were shown. The first 10 questions in the test were related to rotating the shapes at different angles and their views from various directions. In 3 questions, cubes that had pictures on three surfaces and new cubes resulting from the rotation process of these cubes were given. In some questions, cubes were presented that obtained at the end of rotation process and the first cases of the cubes were asked. In addition to them, questions about rotating three dimensional objects (cylindrical or conical shapes) were included in the mental rotation test. The questions in the test evaluated as true or false and the number of correct questions constitutes participant's test scores. An example question in the mental rotation test developed by Sezen Yüksel (2013) is as follows:

Please answer the following questions according to the figure given in the side



1- Which is the shape formed after rotating the shape above by 45° around x axis?

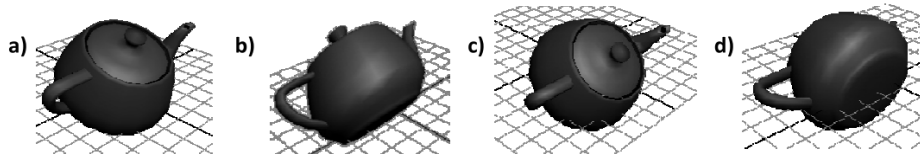


Figure 1. An example question from the mental rotation test

Data Analysis

Data obtained from mental rotation test were analyzed by using the SPSS 20.0 software package. Descriptive statistics (standard deviation values, the arithmetic mean, etc.) were used. Also independent sample t test for comparing the test scores of the departments and one way variance analysis (ANOVA) for comparing grades' test scores in the departments were utilized. When any significant difference was found, it was identified by the Tukey test. Independent samples t-test was also used to compare different departments of the same class. All the analyses were made in 95 % confidence interval and $p < 0,05$ values were accepted as statistically significant. The results were presented in tables.

RESULTS

The examination and comparison of mental rotation skills of elementary mathematics education and mathematical engineering students were given in this section.

Descriptive statistics values of the mental rotation scores of elementary mathematics education and mathematical engineering students were shown in Table 2.

Table 2. Descriptive statistics - EME: Elementary Mathematics Education, ME: Mathematical Engineering

	N	Minimum	Maximum	Mean	Std. Deviation
EME 1	34	7	26	15.03	4.661
EME 2	26	10	24	17.69	3.728
EME 3	24	9	27	18.21	4.201
ME 1	69	3	23	10.67	5.204
ME 2	46	10	26	19.04	3.910
ME 3	22	7	26	17.27	5.708

According to the results of descriptive statistics, the mean of the freshmen students of the elementary mathematics pre-service teachers is 15.03, sophomore students' mean value is 17.69, and junior students' mean

value is 18.21. Beside, mean value of the first grade of mathematical engineering students is 10.67, the second grade students' mean value is 19.04, and third grade students' mean value is 17.27. Before determining which test was applied, the obtained data were examined whether they correspond to a normal distribution. Normality test results were given in Table 3.

Table 3. Normality test results

	Kolmogorov-Smirnov			Shapiro-Wilk		
	N	Statistic	Sig.	N	Statistic	Sig.
EME1	34	.118	.200	34	.971	.731
EME2	26	.141	.200	26	.948	.287
EME3	24	.124	.200	24	.976	.848
ME1	69	.126	.200	69	.942	.220
ME2	46	.141	.200	46	.975	.822
ME3	22	.187	.044	22	.914	.058

To determine whether the data show normal distribution or not, firstly the number of data are examined. If the number of data is greater than 29, Kolmogorov-Smirnov value was used and if the number of data is less than 29, Shapiro-Wilk value is used (Kalaycı, 2010). As shown in Tablo 3, for EME2, EME3 and ME3 Shapiro-Wilk values, for EME1, ME1, ME2 Kolmogorov-Smirnov values were used. Because all values were greater than 0.05, at 5 % significance level the data showed a normal distribution.

Because data were appropriate for normal distribution, independent sample t test from parametric tests was utilized for the comparison of mental rotation test scores of elementary mathematics education students and mathematical engineering students in data analysis. Whether or not there was a significant difference between the mental rotation test scores of students was determined and the results were provided in Table 4.

Table 4. Independent sample t test results of mental rotation test scores according to departments

	N	X	s.d	t	p
EME	84	16.76	4.45	2.838	0.005
ME	137	14.54	6.26		

When Table 4 was examined, it was observed that that there was a significant difference between the mental rotation test scores of undergraduate students in departments ($t=2.838$, $p<0.05$). Accordingly, the scores of elementary mathematics pre-service teachers ($X=16.76$) was higher than mathematical engineering students ($X=14.54$).

Whether there was any significant difference between the mental rotation test scores of the undergraduate students according to their grades was determined by one way variance analysis (ANOVA). The analysis results were presented in Table 5, Table 6, Table 7 and Table 8.

When the comparison was made between grades in elementary mathematics education students, the results in Table 5 and Table 6 occurred.

Table 5. The ANOVA results of elementary mathematics education students

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	174.771	2	87.385	4.814	.011
Within Groups	1470.467	81	18.154		
Total	1645.238	83			

When Table 5 was examined, undergraduate students' mental rotation test scores had a statistically significant difference by their grades ($F=4.814$; $p<0.05$). Tukey methodology was applied to evaluate multiple comparisons of grades.

Table 6. Multiple comparisons of elementary mathematics education students

EME Grades	EME Grades	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-2.66290*	1.11003	.049	-5.3131	-.0126
	3.00	-3.17892*	1.13594	.017	-5.8910	-.4668
2.00	1.00	2.66290*	1.11003	.049	.0126	5.3131
	3.00	-.51603	1.20608	.904	-3.3956	2.3636
3.00	1.00	3.17892*	1.13594	.017	.4668	5.8910
	2.00	.51603	1.20608	.904	-2.3636	3.3956

As a result of the Tukey test analysis, it was concluded that significant differences were found between freshmen and sophomore students ($p = 0.049 < 0.05$) and sophomore students' mental rotation test scores were higher than freshmen students' test scores. Similarly, there was a significant difference between freshmen and junior students ($p = 0.017 < 0.05$) and junior students' mental rotation test scores were higher than sophomore students' test scores. No significant difference was found among sophomore and junior students ($p = 0.904 > 0.05$).

A comparison between mathematical engineering students' grades is made by one way variance analysis (ANOVA) test and the results in Table 7 and Table 8 were obtained.

Table 7. The ANOVA results of mathematical engineering students

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2132.419	2	1066.210	44.458	.000
Within Groups	3213.610	134	23.982		
Total	5346.029	136			

According to this finding, it can be said that there was a significant difference between the mental rotation test scores of mathematical engineering students by their grade ($p = 0.00 < 0.05$). Addition to that, to make multiple comparisons of different grades of mathematical engineering students, it was applied Tukey test.

Table 8. Multiple comparisons of mathematical engineering students

ME Grades	ME Grades	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-8.37681*	.93216	.000	-10.5861	-6.1676
	3.00	-6.60606*	1.19903	.000	-9.4478	-3.7643
2.00	1.00	8.37681*	.93216	.000	6.1676	10.5861
	3.00	1.77075	1.26943	.346	-1.2378	4.7794
3.00	1.00	6.60606*	1.19903	.000	3.7643	9.4478
	2.00	-1.77075	1.26943	.346	-4.7794	1.2378

Sophomore students' mental rotation test scores were higher than freshmen students' test scores and there was a significance difference between them ($p = 0.00 < 0.05$). The mean difference between them is also 8.37681. Besides, junior students' mental rotation test scores were higher than freshmen students and the mean difference between them is 6.606. Significant differences were found between these groups. There was no significant relationship between sophomore and junior students ($p = 0.346 > 0.05$).

To compare two different department students' mental rotation test scores in the same grade level independent sample t test was used. The results obtained were given in separate grade level.

Table 9. Comparison of mental rotation test scores of different departments for freshmen students

	N	X	s.d	t	p
EME 1	34	15.02	4.66	4.054	0.000
ME 1	69	10.75	5.19		

Table 9 showed that there was a significant difference between the mental rotation test scores of freshmen students ($p = 0.00 < 0.05$). Accordingly, it was seen that elementary mathematics education students test scores ($X = 15.02$) was higher than mathematical engineering students ($X = 10.75$).

Table 10. Comparison of mental rotation test scores of different departments for sophomore students

	N	X	s.d	t	p
EME 2	26	17.69	3.72	-1.432	0.157
ME 2	46	19.04	3.90		

According to the results of the analysis, mental rotation test scores of sophomore students showed no significant differences by department ($p = 0.157 > 0.05$).

Table 11. Comparison of mental rotation test scores of different departments for junior students

	N	X	s.d	t	p
EME 3	24	18.20	4.20	0.637	0.528
ME 3	22	17.27	5.70		

No significant difference in the junior students mental rotation test scores from different departments was found ($p = 0.528 > 0.05$).

CONCLUSIONS

Results obtained from this study that compared mental rotation ability of elementary mathematics education and mathematical engineering students can be summarized as follows:

When the mental rotation test scores were examined, it was seen that the highest scores belongs to sophomore students of mathematical engineering department. Also, grade level of elementary mathematics pre-service teachers increases so does average test scores of mental rotation. Among mathematical engineering students, test scores of freshmen students are lowest, after them the third and second grade levels are listed. There is a significant difference between mental rotation ability of elementary mathematics pre-service teachers and mathematical engineering students and this difference is in favor of elementary mathematics pre-service teachers. Spatial ability of engineering students is very important for their future business life. When the grade levels increase, with the impact of the courses they have taken in the faculty development of these skills are expected. However, these studies did not show such an effect. After first grade level, mental rotation ability of them increased but this increase did not continue to 3rd grade level. The highest level of mathematical engineering student's mental rotation ability is in 2nd grade level. A decline is seen in scores when they reach to 3rd class. When you look at the results for elementary mathematics pre-service teachers as the class level increases the mental rotation abilities also increases.

It is important to develop these aspects of the teachers who will give gain ability, especially on spatial geometry lessons to students in professional life. In curriculum of education faculty, geometry courses are given in the first grade, later in the third grade analytic geometry I and analytic geometry II courses are given. According to the results we can say that in the rise of mental rotation ability of students, the course they have received during their education is effective. The study that leads to this conclusion indicates that given courses or applications may increase students' spatial abilities. Indeed in the studies performed with elementary mathematics pre-service teachers, Güven and Kösa (2008) reached the results that indicate the training realized with Cabri 3D affect student's spatial ability positively and Uygan (2011) reached similar results about the training carried out with Google SketchUp. According to other results obtained from this study, when compared the mental rotation ability of the 1st, 2nd and 3rd grade elementary mathematics pre-service teachers there are significant differences statistically between the first and second grade levels and between the first-grade and third grade levels. Mental rotation skills between the second and third grade levels are not different. Mental rotation ability that is the lowest in the first grade increased significantly at the level of 2nd and 3rd grades. In comparison of this difference, in the transition to the second and third grade levels from the first grade level has statistical difference but it isn't seen this difference in the transition to the second from the third grade level. These results can be again connected to the training in the faculties of education. In addition, the increased age, different thinking skills gained in courses, materials and computer-aided courses they received may have been effective in promoting this result. When compared to the mental rotation ability of 1st, 2nd and 3rd grade mathematical engineering students, similar to elementary mathematics pre-service teachers, there are significant differences statistically between the first and second grade levels and between the first and third grade levels. Mental rotation skills between the second and third grade levels are not different. Different from the students in faculty of education, the highest score of engineering students is 2nd year students. Being at first rise and later decline may be due to students who participate this sample but we cannot say that the courses in the faculty of engineering have been directly instrumental in the development of spatial ability of students. When compared to the mental rotation ability of the same grade level students of department of mathematical engineering and elementary mathematics education, a significant difference was observed only between 1st grade levels.

Mental rotation ability scores of 2nd and 3rd grade students of these different departments do not differ statistically. The average score of mental rotation abilities of the students who choose the teaching profession is greater than about 5 points compared to students who prefer the engineering faculty. In fact, these results are surprising because students in engineering are expected being in studies that require more spatial thinking in their future life. The results in this study may be a consequence relating to the selected sample, so working with different samples can be performed and can be made comparisons.

References

- Alias, M., Black, T. R., & Gray, D. E. (2002). Effect of instruction on spatial visualization ability in civil engineering students. *International Education Journal*, 3(1), 1-12.
- Battista, M. T. (1990). Spatial visualization and gender differences in high school geometry. *Journal for Research in Mathematics Education*, 21, 47-60.
- Clements, D. H. & Battista, M. T. (1992). *Geometry and spatial reasoning*. D. A. Grouws (Ed.), in Handbook of research on mathematics teaching and learning (420-464). Toronto: Macmillan.
- D'Oliveira, T. C. (2004). Dynamic spatial ability: An exploratory analysis and a confirmatory study. *The International Journal of Aviation Psychology*, 14(1), 19-38.
- Dursun, Ö. (2010). *The relationships among preservice teachers' spatial visualization ability, geometry self-efficacy, and spatial anxiety*. Unpublished doctoral dissertation, Middle East Technical University, Ankara.

- Güven, B. & Kösa, T. (2008). The effect of dynamic geometry software on student mathematics teachers' spatial visualization skills. *The Turkish Online Journal of Educational Technology*, 7(4), 100-107.
- Kalaycı, Ş. (2010). *SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri*. Ankara: Asil Yayın Dağıtım Ltd. Şti.
- Karaman, T. (2000). *The relationship between gender, spatial visualization, spatial orientation, flexibility of closure abilities and the performances related to plane geometry subject of the sixth grade students*. Unpublished master's thesis, Bogazici University, Istanbul.
- Karasar, N. (2007). *Bilimsel Araştırma Yöntemi*. Nobel Yayıncılık, Ankara.
- Kayhan, E. B. (2005). *Lise öğrencilerinin uzaysal becerilerinin incelenmesi*. Unpublished master's thesis, Middle East Technical University, Ankara.
- Linn, M.C. & Petersen, A.C. (1985). Emergence and Characterization of Sex Differences in Spatial Ability: A- Meta Analysis, *Child Development*, 56, 1479-1498.
- Lord, T. R. (1985). Enhancing the visuo-spatial aptitude of students. *Journal of Research in Science Teaching*, 395-405.
- Maier P. H. (1996) Developments in Mathematics Education in Germany Selected Papers from the Annual Conference on Didactics of Mathematics, Regensburg, 1996. 69-81.
- NCTM, (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- Olkun, S. (2003). Making connections: improving spatial abilities with engineering drawing activities. *International Journal for Mathematics Teaching and Learning*. accessed on May, 18 2012 from <http://www.cimt.plymouth.ac.uk/journal/default.html>.
- Sezen Yüksel, N. (2013). *Uzamsal yetenek, bileşenleri ve uzamsal yeteneğin geliştirilmesi üzerine*. Unpublished doctoral dissertation, Hacettepe University, Ankara.
- Stockdale, C., Possin, C. (1998). *Spatial Relations and Learning*. accessed from <http://impactofspecialneeds.weebly.com/uploads/3/4/1/9/3419723/spatial.pdf> on May, 06, 2013.
- Tekin, A. T. (2007). *Dokuzuncu ve on birinci sınıf öğrencilerinin zihinde döndürme ve uzamsal görselleştirme yeteneklerinin karşılaştırılması olarak incelenmesi*. Unpublished master's thesis, Ankara Üniversitesi, Ankara.
- Turgut, M. (2010). *Teknoloji destekli lineer cebir öğretiminin ilköğretim matematik öğretmen adaylarının uzamsal yeteneklerine etkisi*. Unpublished doctoral dissertation, Dokuz Eylül Üniversitesi, İzmir.
- Unal, H. (2005). *The influence of curiosity and spatial ability on preservice middle and secondary mathematics teachers' understanding of geometry*. Unpublished doctoral dissertation, The Florida State University, Florida.
- Uygan, C. (2011). *Katı cisimlerin öğretiminde google sketchup ve somut model destekli uygulamaların ilköğretim matematik öğ-retmeni adaylarının uzamsal yeteneklerine etkisi*. Unpublished master's thesis, Eskişehir Osmangazi Üniversitesi, Eskişehir.
- Yıldız, B. (2009). *Üç boyutlu ortam ve somut materyal kullanımının uzamsal görselleştirme ve zihinde döndürme becerilerine etkileri*. Unpublished master's thesis, Hacettepe Üniversitesi, Ankara.

The Ibse In Chemistry Teaching – Implementation And Evaluation

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ABSTRACT

The Inquiry-based Science Education is currently one of the major trends in science teaching. It is a teaching method which may help to reverse the decline of student's abilities to understand and explain phenomena, to carry on experiments, to make conclusions and to substantiate them. This approach is very promising not only in chemistry teaching but also in other exact sciences. The article presents particular tasks meeting the IBSE criteria, discusses experience from their practical use and submits possible methods of evaluation of student's knowledge and skills.

INTRODUCTION

Inquiry-based Science education is one of the current educational trends which are very intensely discussed among the expert public. Several professional works with this theme were published recently, and it is also a theme of many professional conferences (Mayer, 2004). However, the inductive approach is nothing new – we know of many teaching methods that did and do use it in chemical education (Čtrnáctová, Banýr, 1997). Why, then, is IBSE one of the new educational trends?

In the recent years, a large number of international studies monitoring the students' knowledge, skills and interest in science was implemented. These studies show that our students have very good level of scientific knowledge, however, there was a significant decrease in the areas of explaining phenomena, understanding the laws of nature and grasping the abstract concepts and explanations of the students' own claims (Tomášek, 2007). Students' main difficulties lie in the area of creation and formulation of hypotheses and using research methods; they also have problems with experimental activities and the interpretation of data.

For example, the TIMSS 2007 survey studied four knowledge levels in science, characterized as follows: The Level 1 students (the lowest) have some basic knowledge of animate and inanimate nature. The Level 2 students are able to apply basic scientific findings on specific situations in real life. The Level 3 students can use the acquired knowledge to explain natural phenomena they observe in daily life and they show understanding of certain laws. The Level 4 students (the highest) show understanding of complex systems and abstract terms and they are able to explain their claims.

The survey shows that the representation of Czech students of 4th and 8th grade in the top two levels significantly decreased during the period of 1995-2007. This decrease mainly happened in 1995-1999, the situation did not change much afterwards.

Other countries of the European Union are in similar situation to the Czech Republic. Because of that, a report of the European Research Commission recommends (Rocard et al., 2007) the application of new teaching methods, especially those that use the inquiry-based approach.

IBSE

The basic principle of Inquiry-based Science Education is the independent research by the students, the acquiring of knowledge, information and skills through solving problems. This method helps the students to independently form research and scientific problems and hypotheses and to suggest their solutions. It also supports the students in their attempts to gain information from professional texts, to process them and to connect them into a meaningful whole. The students exercise their teamwork skills and acquire the scientific methodology (i.e. collection and comparison of data, working with control samples etc.) and the ability to discuss the results and form the conclusions.

This way of teaching is a simulation of scientific procedure, from stating a hypothesis to its verification and evaluation. The teacher's role here is not to be a lecturer, but more like a coordinator and advisor for the students as he/she helps them to achieve the required goal. He/she guides the students so they would learn how to search

for information, how to gauge whether it's relevant or not, how to pick out the information necessary for solving the problem and how use the information so acquired to solve it.

How, then, do the individual phases of the teaching look?

We start by motivating the students – with some problem, some mystery. It is useful to include a motivational experiment or video.

We start with a motivation - give a problem, a riddle. A motivation experiment or video may be useful.

During the lesson, the students follow the following steps:

I don't understand something, I'm interested in it, I'm solving a problem

I ask myself how I should understand this.

I try to find out whether there's someone else who'd understand it.

I state a hypothesis

I verify whether the hypothesis hold – I inquire and experiment

I confirm the hypothesis

I refute the hypothesis

Figure 1 shows the principle of the IBSE method (simplified).

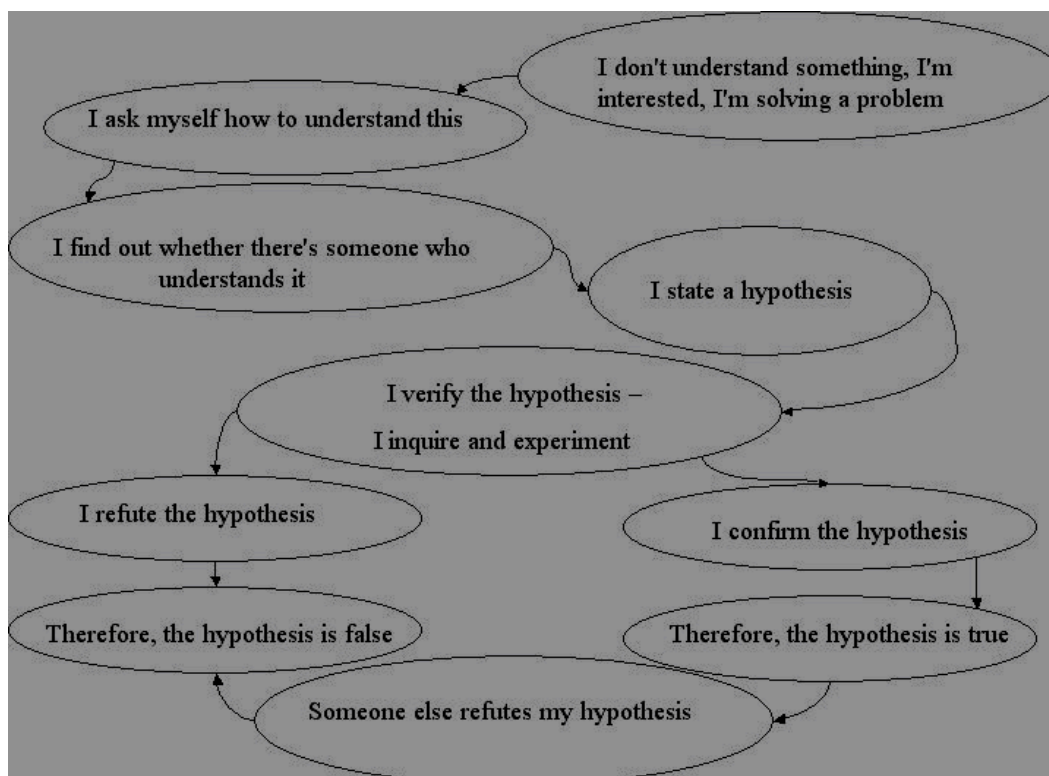


Figure 1: Circle of inquiry-based education

IMPLEMENTATION OF INQUIRY-BASED APPROACH IN CHEMISTRY TEACHING

If we want to research how does the use of IBSE influence the students' approach to chemistry and scientific subjects in general, we need sufficient amount of materials that would allow implementing the inquiry-based approach in the chemistry lessons. Table 1 shows some examples of themes and problems created for them.

Table 1: An overview of themes and problems from general and inorganic chemistry

Chemistry curriculum themes	Problem
Density of Substances	Floating Egg
Mixtures and Their Separation	Help Cinderella!
Oxygen and its Compounds	Liver and Oxygen
Carbon Dioxide and its Properties	Spewing Volcano
Calcium Carbonate and its Reaction with Acid	Indecent Egg
Active Charcoal and its Properties	Underwater Volcano
Speed of Chemical Reactions	Fast and Faster

Let's have a look at the theme "Carbon Dioxide and its Properties":

The "Carbon Dioxide" theme will be introduced by the experiment "Spewing Volcano". We shall use baking soda, vinegar, detergent and food coloring for this experiment. In the following experiment, the students are asked to suggest how to prove the presence of carbon dioxide and verify its properties. There are many properties of carbon dioxide they can verify experimentally – that it forms acids, how dense it is, that it's a gas, that it doesn't support combustion, etc. The chemicals students use are vinegar and sodium bicarbonate, so this experiment as well uses student-safe chemicals.

The lesson starts by the teacher asking the students: "What do you know about the carbon dioxide?" The students write whatever they come up with. They usually mention the following knowledge about carbon dioxide: it's a gas, people breathe it out, it's formed during combustion, it plays a part in photosynthesis, it doesn't support burning, it forms acids, it's heavier than air, it's colorless, etc. Following this, each group of students – after discussing this with the teacher – chooses one of these characteristics, as long as it can be verified in the conditions of the school lab. When the students select a characteristics of carbon dioxide to be verified, they also get hints from the tools the teacher puts in front of them. This could be for example a candle or a wooden skewer, which could lead the students to an experiment to verify that carbon dioxide does not support burning. The students have to suggest an experimental procedure to verify this particular property or characteristic of the gas, based on the tools they get. The results of the student experiments are recorded on a sheet. The conclusions on the student sheets show that the most appreciated part is the ability to work in a completely unconstrained way, to use their existing chemistry knowledge and to suggest their own experiments. There are some problems with deriving general conclusions and dividing the work among the group, but the students improve with time.

We'll give a short description of other problems as well.

In the first problem, "Floating Egg", the students put an egg in two solutions which don't seem to differ in any way. In one solution (water), the egg sinks, in the other (saturated salt solution), it floats. Afterwards, the students solve several problems on the worksheet which should bring them to the basic hypothesis: that the solution densities are the key to the solution. Afterwards, they will suggest an experiment that would prove their conjecture right. The problem can be made more attractive through the use of food coloring.

"Help Cinderella!" is a problem which concerns itself with methods of separating mixtures. The students are given a mixture of salt and pepper and their goal is to separate these components. The advantage of this problem is that the students are absolutely free to suggest various experiments. If they don't succeed at first, they will evaluate their results and determine how to improve the procedure for next time. The problem can be expanded by adding oil as an additional mixture component.

The preparation of oxygen using liver has a very interesting motivational part. It makes use of the catalytic dissociation of hydrogen peroxide, but instead of using the usual manganese heptoxide as a catalyst, it uses the enzyme catalase that is present in blood and liver. The liver is mixed with some water, and hydrogen peroxide is added. The reaction is extremely rapid, creating foam of precipitated proteins. After the foam is removed, we can prove that oxygen was produced by igniting a smoldering wooden skewer. The students are supposed to suggest which substances are produced and perform an experiment that would verify their hypothesis. During the experiment, the students will discover the importance of the enzyme catalase as a catalyst. As we know, the spontaneous dissociation of hydrogen peroxide takes more time and wouldn't achieve concentration of oxygen necessary for the skewer to ignite. In the end, the students repeat the experiment using manganese heptoxide as a

practical verification of the fact that various substances may be used as catalysts, without affecting the resulting products.

The problem "Indecent Egg" is based on the fact that carbonates react with acids. After the egg is pickled in vinegar, its solid carbonate shell dissolves, so the egg is now protected only by the elastic membranes. During the pre-lab preparation, the students will get acquainted with components of the egg shell and with the reactions of carbonates. The subject of their experiment should be the "dissolving" of the eggshell and possibly the proof of the gas produced by the reaction.

The "Underwater Volcano" is a motivational experiment based on different miscibility of cold and hot water. Hot water with food coloring is prepared in an Erlenmeyer flask, which is suspended on a string into a larger vessel filled with cold water. The students' goal is to get clean water through filtrating the mixture of colored water and active charcoal.

The problem "Fast and Faster" concerns itself with the course and speed of chemical reactions. The students gather information while working with the text and, in cooperation with the teacher, discuss various factors that can affect the speed of chemical reactions. Such factors are, for example, the temperature of the reaction mixture, reactant concentration, or the surface of the reacting substances. The students will select a factor they are going to verify and suggest an experiment to support their hypothesis. The students use zinc and hydrochloric acid during this activity.

With the standard approach, the students are more passive: the teacher gives them precise procedure for the experiment and they complete it, step by step. IBSE forces the student to have much more active approach to finding the answers. This type of teaching is more demanding for the students and not all of them are able to deal with it from the beginning, but they will interactively absorb the knowledge and connect it to other sensations. This will improve the memorization of facts. However, at the same time this approach leads not to memorization learning but to understanding of problems. The students' own experiences with experiment and practical presentation of a specific characteristic teaches the students to connect the acquired facts and move from understanding the individual steps to understanding the whole.

EVALUATION

We use the self-contained evaluation material *Diagnostické nástroje na podporu výskumne ladenej koncepcie v prírodovednom vzdelávaní* (Bergman, 2013) which supports the effective implementation of research-oriented approach to the education in scientific disciplines. Bergman prepared, among other things, evaluation sheets which track the teacher's role, the students' activities and their records, and simultaneously enable him to determine how much do the lessons correspond to the IBSE requirements. The various sheets are focused on the role of the teacher or they evaluate the students' activities and records.

Table 2 shows a part of the evaluation sheet "Student Activities"

Item	Explanation and examples	Evaluation		
		Yes	No	Inapplicable
Did the students see solving of the research question as their own, even though you might introduce the question to them?	The students consider the question their own if they are able to explain what they want to do or find out in their own words.	Yes	No	Inapplicable
Were the students' assumptions based on their previous experiences?	The students were able to explain their assumption, even when it was imprecise or incorrect, thus showing that it wasn't a mere guess.	Yes	No	Inapplicable
Did the students participate in the planning of the research?	The students themselves suggested how to resolve the problem and how to answer the question, although they sometimes needed help to resolve the details.	Yes	No	Inapplicable
Do the students suggest correct research procedures that include variable control?	The students suggest, during their research activity, which variables need to be manipulated and which should be kept unchanged.	Yes	No	Inapplicable
Did the students realise the research on their own?	The students gathered data on their own (through direct observation of the objects, measurement or from secondary sources) and used them during arguments – they were not merely watching other students gathering data.	Yes	No	Inapplicable

CONCLUSIONS

In my research work, I observe the influence of IBSE on students and its effect on their knowledge and their ability to understand the principles of chemical processes. At the same time, however, I'm trying to verify that the application of IBSE is able to motivate the students to study chemistry and have positive effect on their perception of the subject. I.e.: will this arouse interest in science and phenomena encountered in their everyday life? Use of simple experiments will also support the students' ability to work metodologically when solving problems, their critical and logical thinking will be developed, and they will also get into habit of verifying information and its sources.

References

- Bergman, G. *Diagnostické nástroje na podporu výskumne ladenej koncepcie v prírodovednom vzdelávaní*. Trnava: TYPI
 UNIVERSITATIS TYRNAVIENSIS; 2013. ISBN 978-80-8082-792-2
 Čtrnáctová, H., Banýr, J. *Historie a současnost výuky chemie u nás* in Chemické listy. Roč. 91, 1997, s. 59-65.
 Mayer, R. (2004). Should there be a three-strikes rule against pure discovery learning? The case for guided methods of instruction. *American Psychologist*, 59 (1), 14-19.
 Rocard, M., Cesrmley, P., Jorde, D., Lenzen, D., Walber-Herniksson, H., Hemmo, V. *Science education NOW: A Renewed Pedagogy for the Future of Europe*.
 Tomášek, V., et al. (2007). *Výzkum TIMSS 2007: Obstojí čeští žáci v mezinárodní konkurenci?* Praha: ÚIV.

The Importance Of Environmental Education In The Implementation Of Reverse Logistics Retail

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ABSTRACT

The adoption of environmental practices is growing in the retail supermarket. Thus, demonstrate the environmental advantages and the importance of environmental education in the implementation of reverse logistics practices in the retail supermarket was the objective of this research. In order to achieve a field research with participatory observation was carried out for 6 months at a supermarket in the state of São Paulo/Brazil to follow environmental education incorporated into daily life and their results generated by each department. Using the method Wuppertal, was quantified the volume of waste which ceases to be generated in each department after implementation. By participant observation, a new routine was noted part of daily life and a new attitude that has generated benefits in the workplace and contributing to the sustainability of the business by reducing the disposal of influencers materials on global warming and the depletion of the ozone layer.

Keywords: Education, environmental

INTRODUCTION

Environmental preservation is a frequent theme in the current business scenario. The awareness of the companies towards the conservation of natural resources involves more than the possibility of branding and customer loyalty. Environmental sensitivity is present in several countries, and in Germany and the Netherlands, this perception on the part of the agents (companies and individuals) is quite high. In other countries such as the USA, the largest force linked to reverse logistics is associated with the potential value that can be recovered from the reuse of products, parts or recycled materials (Kokkinaki; Dekker; Koster & Pappis, 2001).

In this context, the retail began to take on new tasks, such as the commitment to reduce the waste generated, recycling and reuse of what was being generated with the purpose of increasing their responsibility to the final consumer (Braga Junior & Rizzo, 2010).

One of the ways was adopted the practice of reverse logistics which is recognized as the area of logistics business that plans, operates and controls the flow and logistic information corresponding to the return of after-sales and post-consumer goods to the production cycle through reverse distribution channels, adding value to them of different nature: economic, ecological, cool, logistics, corporate image, among others (Leite, 2002).

This care is due to the fact that the incorrect disposal of waste strongly reach the environment. Currently, supermarket retailers are paying more attention to the practice of reverse logistics, due to great public concern for the environment and also the influence of the establishment of laws, such as the National Solid Waste Policy (NSWP) Brazilian.

The use of reverse logistics allows the recycling of support resources used by retailers, ensuring the return of these materials to the production process and reducing the environmental impact. Thus, the problem of research that guides the present study may be expressed by the following question: How Reverse Logistics practices deployed by a supermarket of Alta Paulista region contributes to sustainability? In this sense the objective of the research was to analyze the reverse logistics practices carried out by a supermarket and quantify the volume of waste generated by department.

As a result, it was observed that the supermarket failed to produce 20 tons of biotic and abiotic materials per month (using the method Wuppertal), and these influencers materials on global warming and the depletion of the ozone layer.

Another result observed with the implementation of reverse logistics was that the grocery department is what most uses cardboard and plastic packaging and that the grocery and meat departments are increasingly using less plastic packaging and cardboard and increasing the use of returnable packaging and durable thus promoting sustainability.

REVERSE LOGISTIC

Among the environmentally correct actions, carried out between the companies in the retail supermarket, follow-up, are included the use of recyclable packaging, encouraging the practice of selective waste collection, the prevention of waste of natural resources such as water and electricity, among others (Parente & Gelman, 2006).

In fact, the retail supermarket is increasing its accountability to the consumer and the environment. Companies that adopt the environmentally friendly practices are recognized by the consumer, thus creating a competitive advantage in the marketplace. Another result from actions for these factors, the retailers that operate in the supermarket area, is increased business profitability, thus generating economic benefits. Companies are the main users of natural resources and also the responsible for global economic development (Junior & Rizzo, 2010). With the changes over time, especially since the industrial revolution, organizations began to produce consumer items on a large scale, greatly increasing the amount and diversity of waste generated in urban areas (Motta, 2011). Thus, there was the need to create an alternative to process these waste.

The scarcity of raw materials and increasing public awareness regarding the preservation of the environment, along with the idea of being against waste, are some of the factors behind the development of reverse logistics (Rodrigues, 2002). International companies are adopting reverse logistics techniques and evaluating inventory organizational methods, so that the demand is met by manufactured materials, meeting the needs of consumers and effective way of contributing to the environment (Reyes & Meade, 2006).

According to Braga Junior, Merlo & Nagano (2009), in the supermarket retail reverse logistics can emerge as a new possibility of gain, and generate a great image for the company, assuming the role of environmentally friendly company. In addition, reverse logistics also assists in the performance of the organization, leading to recovery than was generated and would be discarded, helping to reduce the environmental and social impacts of waste generated by this sector also incorporating the social and economic aspects (Santos et al, 2014).

Braga Junior & Rizzo (2010) also explain the importance of reverse logistics in the supermarket sector, from the perspective of contributing to the reduction of social and environmental impacts, providing the opportunity to recycle paper, plastic, cardboard, pallets, and other products coming from suppliers to supermarkets, allowing the emergence of a secondary market that generates direct and indirect jobs.

According to Rossi and Cullen (2011), reverse logistics, when applied, can bring economic advantages due to the values of the products with original costs before the values of the returned products, and recycled products have a significantly lower value compared to the cost of the original item. In this respect, some German companies use reverse logistics model to maximize your profits, arising from the sale of materials that can be recycled, thus generating a financial return for the organization (Reyes & Meade, 2006).

According to Horvath, Autry & Wilcox (2005), the amount, timing and uncertainty of retailers in cash flows from operations affect the size and dynamics of its liquidity position. Since the returned products can represent a significant percentage of sales, even during periods of low peak return, the reverse logistics activities play an important role in the calculation of expected cash flows, both directly and indirectly.

Leite (2003) analyzes the reverse logistics in the supermarket sector is made up of four main elements: industry; retail; and the final consumer; the secondary market (represented by the recycling companies). These elements interact with each other making the purchase and sale transactions, where the retail purchase the finished products industry and resell it to the final consumer. The reverse flow is given from the consumer, who reviews the packaging for retail and it sells to the secondary market, which, in turn, sell the recycled material for the industry, thus restarting the cycle.

Over time, the Reverse Logistic concept has had some modifications. However one of the main settings is given by Rogers & Tibben-Lembke (1999) where the reverse logistics encompasses all logistical procedures of a company, but in the opposite direction, belonging to the two only the concepts of recycling and removal of waste and the administration of returns.

Authors such as Daher, Silva & Fonseca (2006); Rossi and Cullen (2011) cite the reverse logistics definition given by Tibben-Lembke (1999), as "the process of planning, implementing and controlling the efficient flow and cost of raw materials, work in process, product finished and information related from the point of consumption to the point of origin, relating the operations by reusing products and materials", and this definition is considered one of the most effective as regards the concept of reverse logistics. Being the most complete existing definition, you can find it in several studies with approaches under the theme.

According Horvath, Autry & Wilcox (2005) reverse logistics is not optional, but mandatory. Nevertheless, many companies still do not deploy due to difficulties or even disinterest (Daher, Silva & Fonseca, 2006).

For the implementation of reverse logistics is efficient and generate expected returns UPS Consulting (2004) states that in the first place, we must develop strong reverse logistics strategies, secondly, clearly outline the financial goals, corporate, marketing and others.

The main factors that lead organizations to act in reverse logistics, presented by a group of researchers in universities worldwide, known as RevLog, quoted by Daher, Silva & Fonseca (2006), are: 1) environmental laws; 2) economic benefits and obtained; 3) the growing environmental awareness of consumers. In addition to these, Rogers & Tibben-Lembke (1999) also point to other reasons, which are: 1) competitive reasons; 2) cleaning of the distribution channel; 3) profit margin of protection and; 4) recapture value and asset recovery.

Reverse logistics has been recognized as the area of logistics business that plans, operates and controls the flow and logistic information corresponding to the return of after-sales and post-consumer goods to the production cycle, through reverse distribution channels, adding Them value of various kinds: economic, ecological, cool, logistics, corporate image, among others (Leite, 2002).

The concept also gets a new feature, the also be part of a strategic planning that should be treated as an independent activity, turning their attention to their individual management (Daher, Silva & Fonseca, 2006). UPS Consulting (2004), also has reverse logistics as other business, with goals, objectives, IT resources, individual, and specific staff and responsible for the implementation and development of the business.

For some authors as: Hazen et. al. (2014), Rossi & Cullen (2011) reverse logistics is also recognized as a key issue in the context of management of the supply chain, leading to gaining a competitive advantage in the marketplace.

Internationally, Kokkinaki, Dekker, Koster & Pappis (2001), dealing with the reverse logistics as a factor that has become popular over the years due to environmental sensitivity, which is constantly growing and also to economic factors linked to it . These authors also address legal issues related to reverse logistics, strong, especially in some European countries such as Germany and the Netherlands. The laws present in these countries requires the manufacturer to develop a product reuse policy at the end of their life cycle. In the US, reverse logistics has its greatest strength linked to economic issues. The potential value that can be recovered from the reuse and recycling of products is significant (Kokkinaki; Dekker; Koster & Pappis, 2001).

Nationally and internationally, reverse logistics has been present for years in the concepts and business practices, updating itself as the conditions imposed by the macro and micro environment in which they operate.

RECYCLING AND SOLID WASTE REUSE

Most of the products used are thrown or incinerated, causing considerable damage to the environment. Currently, more stringent legislation and the growing support of actions in environmental education, are driving companies to think on their responsibility for their products after use (Rogers & Tibben-Lembke, 1999).

According to Motta (2011) the word recycling was introduced to the international vocabulary when it was found that the sources of oil and other non-renewable raw materials were (and are) running out. Still to this author, recycling it is a reverse channel revaluation, where members of materials post-consumer product discarded are extracted industrially, turning into secondary raw materials, ie not directly taken from nature, or recycled, and which are then incorporated into the manufacture of new products. Recycling is save energy, save natural resources, bringing back the productive cycle which was thrown out/discarded.

Gonçalves (2003) classifies three-step processes of the production chain of recycling: recovery, encompassing the residue separation processes at source, selective collection, pressing, baling; revaluation, comprising the processes of processing materials such as milling and extrusion and, finally, the processing; that is recycling itself, transforming the materials recovered and reclaimed in a new product.

For Mano, Pacheco & Bonelli (2005), the recycling constitutes in the disintegration products particles incorporated into the soil. The potential benefits of recycling include: a) "Reduction in the consumption of non-renewable natural resources, when replaced by recycled waste; b) Reduction of energy consumption during the production process c) Reduction of pollution "(John, 2000) and d) "Reduction of areas required to landfill as waste is used again as consumer goods "(Pinto, 1999) .

The issue of recycling and reuse of products that would be discarded and the remains that arise over the activities of the retail supermarket, shall create a reverse flow (Braga Junior, Merlo & Nagano, 2009). The reverse flow of goods, which were not consumed, it becomes an important tool for the sustainability of organizations (Braga Junior & Rizzo, 2010).

Authors such as Gonçalves (2003) and Mano, Pacheco & Bonelli (2005) explain that reduce the generation of waste, reusing and recycling, is part of the clean production targets and cleaner production initially employed by the industry and today has been disseminated by various sectors for business. Meet the demands imposed by the National Solid Waste Policy - PNRS, Law No. 12,305 / 2010, it increased investment in technology is needed in education and knowledge management. According to Nonaka and Takeuchi (1997) cited Marchi (2011) is great the importance of generating beliefs, commitments, situations and appropriate interactions, so that the information is converted into knowledge, and can move enhancing behaviors and attitudes.

The PNRS sets standards requiring major market players to provide a suitable destination for solid waste, which is generated in the manufacturing and after consumption of various goods. Thus, one must have a means that enables the return of products and post-consumer packaging for the industry to adopt the processes and the most suitable procedures to recover the waste with the lowest environmental impact.

METHODOLOGICAL PROCEDURES

Whereas the objective of the research was to demonstrate the environmental benefits and the importance of environmental education in the implementation of reverse logistics in the retail supermarket, a study was conducted in the city of Tupã / SP - Brazil, using a supermarket to measure volumes and types of waste that are collected by means of reverse logistics.

To measure and achieve this purpose, the method of analysis of the environmental advantages developed by the Wuppertal Institute, allows the assessment of environmental changes associated with the extraction of resources from their natural ecosystems. Thus, to supply the material flow to a system, a greater amount of material previously processed in various environmental compartments. The compartments are classified as: abiotic, biotic, water and air (Ritthoff, Rohn & Liedtke, 2002).

For conversion of the volumes of data through the Wuppertal method, the table 1 is the means by which the results were obtained and exposed in the survey, where the monthly volume of solid waste generated in kilograms (kg) are multiplied by the corresponding value in the table by so the data for analysis.

Table 1. Conversion table.

	Abiotic Material	Biotic Material	Water	Air
Plastic (g/g) ^a	6,45		294,20	3,72
Paperboard (g/g) ^b	1,86	0,75	93,60	0,33

Source: Ritthoff, Rohn & Liedtke (2002)

The abiotic and biotic material which fields are left the organization of generating the environment in kg and the water and air fields, representing how much longer polluted the environment with the practice of Reverse Logistic (kg).

It is important to note that studies of intensity material developed at the Wuppertal Institute are based on the energy mix in Germany, Europe and World. But that fact does not preclude the implementation of this methodological tool in Brazil, according to the institute quantitative data are very close.

Based on the research problem and the overall goal, the theoretical review of the issues the survey was conducted. Continuing, a field research was done to learn about the process implemented by the research supermarket object and made the collected data from your reverse logistics process research was conducted over the period of six months was made through weekly monitoring and with the aid of a spreadsheet to record the data. With the collected data, they were analyzed qualitatively and quantitatively measuring the environmental benefits generated by the process.

The quantitative nature, measured the environmental advantage of the implementation of reverse logistics in the research object supermarket, allowing develop the case study. Qualitative research, characterized as an attempt to detailed understanding of the meanings and situational characteristics presented by the interviewees and the

cases analyzed, (Yin, 2003), allowed the research observed with depth the deployment process of reverse logistics and the environmental education process that became part of the staff of the supermarket everyday.

ANALYSIS AND SEARCH RESULTS

The supermarket object of research covers an area of 1,300m² with 12 checkouts and records an average monthly flow 45,000-47,000 thousand people. The consumer audience focuses mainly on consumers of classes A and B. However, we also meet the needs of consumers of classes C and D, generating a doctor ticket of approximately R\$ 53.00. Having a favorable layout for the purchase decision, is the only city that offers services and differentiated products, such as telephone shopping service and a wide range of imported products.

Through environmental education process and waste separation, reverse logistics was established less than a year and became part of the local management. With the beginning of the study, began the separation of waste generated, and a more focused management in this process, where waste such as plastic and cardboard are separated into bags and sector (grocery/replacement; cold cuts; butcher; and vegetable garden and fruit).

As previously stated, the retailer makes the separation of different waste bags of plastic and cardboard that is collected by the matrix of the network that is responsible for collecting these waste all branches to only after pressing and sell. This type of process can allow greater efficiency to the retailer therefore focuses volume and processing cost (Braga Junior, Merlo & Nagano, 2009).

Throughout the data collection, we could perceive the influence of seasonality on the waste generated, and in the months of November and December, there was a large increase, mainly in the replacement and crafts fair sector, due to the year-end shopping, where the use of general products is significantly higher.

With the implementation of reverse logistic within six months, it was noted that overall, the object of research failed to generate supermarket 56,829.00 kg abiotic material, in other words, it is not transformed into the environment over time, and 18,161.00 kg biotic materials (which can be transformed into the environment) as shown in Table 2.

Table 2. Overall amount of material generated by the research object supermarket.

	Abiotic Material	Biotic Material	Water	Air
Plastic (g/g) ^a	11,789.35		537,740.50	6,804.92
Paperboard (g/g) ^b	45,039.90	18,161.25	2,266,524.00	7,869.88
Total	56,829.25	18,161.25	2,804,264.50	14,674.80

Also in table 2 shows that the practice of reverse logistics the company no longer pollute 2,788,434.80 liters of water and 14474.49 kg of air, and this relation is the time of manufacture of the materials, quantity water and air are polluted to its making.

To observe more precisely the generation of plastic and cardboard of each sector in the supermarket, individual volumes will be presented. Table 3 you can check the amount of waste generated by the replacement sector. This sector accounts for all dry area encompassing the supermarket grocery departments, bakery, bazaar, textiles and electronics (Parente, 2000).

The replacement sector accounts for approximately 60% of production abiotic material, 58% of production biotic material, 60% by non-pollution of water and 62% by not polluting the air.

The sheer volume of material generated by this sector is due to large amount of consumed products, due to environmental awareness by industries, are being provided increasingly environmentally friendly packaging, cardboard and plastic.

Table 3. Amount of material generated by the replacement sector

	Abiotic Material	Biotic Material	Water	Air
Plastic (g/g) ^a	7,572.30		345,390.80	4,370.80
Paperboard (g/g) ^b	26,209.26	10,568.25	1,318,917.60	4,579.58
Total	33,781.56	10,568.25	1,664,308.40	8,950.38

The involvement of this sector do not stop there. Most employees involved in separation and loading the bags in the trucks are in this sector. This involvement by staff results in environmental education, since in practice, with

the separation and loading of waste, learn the importance and necessity of proper management of these materials, which contribute to the preservation of the environment.

Table 4. Amount of material generated by the cold cuts sector

	Abiotic Material	Biotic Material	Water	Air
Plastic (g/g) ^a	1,935.00		88,260.00	1,116.90
Paperboard (g/g) ^b	4,603.50	1,856.25	231,660.00	804.38
Total	6,538.50	1,856.25	319,920.00	1,921.28

Among all sectors, the cold cuts sector is the least generate waste (Table 4). Once you arrive, the cartons are separated and discarded. The products are cooled only in the plastic packaging, or are arranged on the shelves chilled for consumption. All chilled products such as yoghurts and embedded, are provided in cardboard and plastic-coated packaging. The type of material is more resistant due to the character of the product and often, the very light supplier packaging to be reused. This does not happen when the packaging is damaged and ends up in the retailer to be discarded. As there is direct involvement of employees to separate packaging, the issue of environmental education is also present in this sector, as well as in others.

Table 5. Amount of material generated by the sector Butcher

	Abiotic Material	Biotic Material	Water	Air
Plastic (g/g) ^a	1,612.50		73,550.00	930.75
Paperboard (g/g) ^b	7,354.44	2,965.50	370,094.40	1,285.05
Total	8,966.94	2,965.50	443,644.40	2,215.80

The butcher takes second place in the matter of amount of waste generated (Table 5). This is due to packaging of goods, not necessarily referring only to the consumption factor. The products come packaged in thicker cardboard boxes, and plastic-coated. Thus, due to the cold camera, which humidifies the package in the thaw, and the thickness of the container, the weight of the bags are superior when compared to other sectors, which are thinner and without moisture packaging.

The Farmer's Market (Table 6) is a sector that deals with grocery products in general, and due to seasonality of these products, there was some consumption peaks during the research. The increase in consumption was significant in December, which doubled due to end of year festivities.

Table 6. Amount of material generated by the sector of Farmer's Market

	Abiotic Material	Biotic Material	Water	Air
Plastic (g/g) ^a	683.70		31,185.20	394.64
Paperboard (g/g) ^b	6,872.70	2,771.25	345,852.00	1,200.88
Total	7,556.40	2,771.25	377,037.20	1,595.51

Another relevant fact is that the packaging of fruits and vegetables are being gradually replaced. What was wood, now come in plastic boxes and return to the suppliers to be reused. However, this type of supply still occurs with some of the products such as carrots, oranges, lettuce, cabbage, potatoes, bananas, onions and that can be loaded in large quantities. The average weight per box is 25 kg. More sensitive products such as apple, pear and grape, are provided in smaller cartons, in small amounts, coated plastic.

With this sector analysis, you can identify the importance of each sector within the supermarket, measuring their contribution to the generation of waste that are reflected in the amount of material that fail to generate the environment.

CONCLUSIONS

Reverse logistics is an organizational practice of paramount importance to the environment, contributing to the preservation, failing to generate pollution to soil, water and air.

With the implementation and good management, the results are significantly positive, generating profit for the company, with the sale of materials, environmental awareness of everyone involved in the process and reducing the environmental impact generated by the disposal of materials in landfills.

Due to the high turnover products that occurs in the retail supermarket, the amount of solid waste generated is significant, therefore, adopt this practice is essential and influence the company's image as an environmentally friendly organization.

It was observed that in a short period examined (one half) the supermarket studied failed to generate significant amounts of waste into the environment. For each kg of plastic and recycled cardboard, allowed to generate environmental 2.18 kg of abiotic materials and 0.75 kg of biotic material, and allowed to pollute 107.68 kg of water and 0.56 kg air.

The management identified by industry and presented helps everyone are directly involved in the separation process thus become more aware about the importance of this practice and its impact on the environment, adopting new practices in day-to-day, which generates impact positive in their families and living circles, adopting new behaviors as well.

It can be concluded that reverse logistics as well as a great ally in the preservation of the environment in general, is also a strong influential for environmental education of everyone involved in the process, from the manager, to those who deal directly with the separation of residues.

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References

- Bernon, M., Rossi, S., & Cullen, J. (2011). Retail reverse logistics: a call and grounding framework for research. *International Journal of Physical Distribution & Logistics Management*, 41(5), 484-510.
- Braga Junior, S. S. B., Merlo, E. M., & Nagano, M. S. (2009). Um estudo comparativo das práticas de logística reversa no varejo de médio porte. *Revista da Micro e Pequena Empresa*, 3(2), 64-81.
- BRASIL. PNRS – Política Nacional de Resíduos Sólidos (1991). Subemenda Substitutiva Global de Plenário ao Projeto de Lei nº 203, de 1991, e seus apensos. Disponível em: <<http://www.revistasustentabilidade.com.br/reciclagem/reciclagem/documentosinteressante/relatorio-final-da-politica-de-residuos>>. Acesso em: 28 mar, 2014.
- Cooper, D., & Schindler, P. S. (2003). *Métodos de pesquisa em administração*. Bookman.
- Daher, C. E., Silva, E. P. D. L. S., & Fonseca, A. P. (2006). Logística reversa: oportunidade para redução de custos através do gerenciamento da cadeia integrada de valor. *Brazilian Business Review* 3(1), Jan-Jun.
- Gil, A. C. (2010). *Métodos e técnicas de pesquisa social*. In *Métodos e técnicas de pesquisa social*. Atlas.
- Gonçalves, P. (2003). A reciclagem integradora dos aspectos ambientais, sociais e econômicos. FASE, DP&A.
- Horvath, P. A., Autry, C. W., & Wilcox, W. E. (2005). Liquidity implications of reverse logistics for retailers: A Markov chain approach. *Journal of Retailing*, 81(3), 191-203.
- John, V. M. (2000). *Reciclagem de resíduos na construção civil: contribuição à metodologia de pesquisa e desenvolvimento*. Universidade de São Paulo, 102.
- Junior, S. S. B., & Rizzo, M. R. (2010). SUSTENTABILIDADE ATRAVÉS DO APROVEITAMENTO DE RESÍDUOS: UM ESTUDO DOS PROCESSOS IMPLANTADOS POR UM SUPERMERCADO DE MÉDIO PORTE/SUSTAINABILITY THROUGH THE UTILIZATION OF WASTE: A STUDY OF PROCEDURES IMPLEMENTED IN A SUPERMARKET FOR MEDIUM SIZE. *Revista Brasileira de Engenharia de Biosistemas*, 4(2), 108-125.
- Kokkinaki, A. I., Dekker, R., de Koster, R., & Pappis, C. (2001). From e-trash to e-treasure: how value can be created by the new e-business models for reverse logistics (No. EI 2000-32/A). *Econometric Institute Research Papers*.
- Leite, P. R. (2003). *Logística reversa*. Pearson. São Paulo.
- Mano, E. B., Pacheco, É. B. A. V., & Bonelli, C. M. C. (2005). *Meio ambiente, poluição e reciclagem*. Edgard Blücher.

- Marchi, C. M. D. F. (2011). Cenário mundial dos resíduos sólidos e o comportamento corporativo brasileiro frente à logística reversa. *Perspectivas em Gestão & Conhecimento*, 1(2), 118-135.
- Motta, W. H. (2011). Logística Reversa e a Reciclagem de Embalagens no Brasil. VII Congresso Nacional de Excelência em Gestão. p. 5-9.
- Parente, J. (2000). Varejo no Brasil: gestão e estratégia. Editora Atlas.
- Parente, J., & Gelman, J. J. (2006). Varejo e responsabilidade social. Bookman.
- Pinto, T. D. P. (1999). Metodologia para a gestão diferenciada de resíduos sólidos da construção urbana (Doctoral dissertation, Universidade de São Paulo).
- Reyes, P. M., & Meade, L. M. (2006). Improving reverse supply chain operational performance: a transshipment application study for not-for-profit organizations. *Journal of Supply Chain Management*, 42(1), 38-48.
- Ritthoff, M., Rohn, H., & Liedtke, C. (2002). Calculating MIPS: Resource productivity of products and services (No. 27e). Wuppertal Spezial, Wuppertal Institut für Klima, Umwelt und Energie.
- Rodrigues, D. F., Rodrigues, G. G., Leal, J. E., & Pizzolato, N. D. (2002). Logística reversa—conceitos e componentes do sistema. Curitiba: XXII Encontro Nacional de Engenharia de Produção.
- Saab, W. G. L., & Gimenez, L. C. P. (2000). Aspectos atuais do varejo de alimentos no mundo e no Brasil. *BNDES Setorial*, 11, 101-122.
- Santos, R. B. M., Junior, S. S. B., Silva, D., & Satolo, E. G. (2014). Analysis of the economic and environmental benefits through the reverse logistics for retail. *American Journal of Environmental Protection*, 3(3), 138-143.
- Hazen, B.T., Huscroft, J., J. Hall, D., K. Weigel, F., & B. Hanna, J. (2014). Reverse logistics information system success and the effect of motivation. *International Journal of Physical Distribution & Logistics Management*, 44(3), 201-220.
- UPS Consulting (2004). Reverse Logistic: the least used differentiator.
- Yin, R. K. (2003). Estudo de Caso-: Planejamento e Métodos. Bookman editora.

The Instruction Methods In Teaching Mathematics To Preschool Students With Special Need

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ABSTRACT

Researches indicate that students with special needs having difficulty during the school life in mathematics skills. Therefore, early childhood is critical especially in gaining mathematics ability to the preschool students with special needs. In these period, using the most appropriate teaching methods is so important for the students with special needs. The aim of this article is analyzing the articles and defining teaching methods or programs using in the researches to teach the mathematics to the preschool students with special needs. The articles were searched from the researches publishing in 1990-2015. The articles were selected as the criterions; participants must have been preschool student with special needs and teaching a mathematical skills. According to these criterions 15 articles was selected using an instruction method or program to the preschool students with special needs. The selected articles was analyzed according to their research models, participants, dependence variables and wheather using reliability, social validity, generalization, and maintenance datas. Finally the findings which is obtained from the articles were discussed and reported.

INTRODUCTION

Preschool education is accepted as the period when children form a basis for motor, cognitive, language, socio-emotional and self-care skills. In this period, supporting the academic skills that take part in the scope of cognitive development positively affect the academic skills in primary school period. Children in preschool period obtain and start to use the basic mathematical conceptions in their daily lives that provide the basis for the academic skills they will acquire in primary school. Preschool period has a critical role as it is the period when children start to have either positive or negative attitude towards mathematic.

It is advised that children who make a typical progress in preschool period should be supported in their education environment in terms of classification, matching, comparing, sorting, counting, operations (simple addition and subtraction operations), position-in-space, simple geometric shapes, measuring and graphic reading skills (Aktaş- Arnas, 2015; Ministry of National Education / Preschool Education Program, 2013). Children who make a typical progress in preschool period usually acquire these concepts and skills related to mathematics during concrete experiences in their daily lives. Therefore, rather than transferring knowledge directly, in mathematic teaching, activities such as preparing a stimulatory environment, providing guidance and experiences with concrete materials are preferred for these children who make typical progress (Aktaş- Arnas, 2005).

On the other hand, it is not possible for preschool children with special needs to learn mathematical skills and concepts by themselves like many other skills without being presented any systematically instruction. That's why, in mathematic teaching, methods, suitable for individual needs, having a scientific base, and that is efficient, should be designed systematically for preschool children with special needs. It is believed that the quality of education in mathematic teaching provided for preschool children with special needs will increase if the type of methods and the way to apply them is known by teachers. Knowing these methods is of critical importance as teachers have an application protocol that they can use in education environment.

Mathematics interventions to teach mathematical conceptual concepts and procedural fluency for students with special needs should include systematic instruction in a small group with possibly supportive coaching by the teacher (Bryant et al., 2011) and also it was suggested that explicit teaching of basic numeracy skills. When literature on this issue is investigated, it can be seen that a great number of reviews and meta- analyses (Butler, Miller, Lee ve Pierce, 2001; Grasso, Dipipi-Hoy and Jitendra, 2005; Browder, Spooner, Ahlgrim- Delzell, Harris and Wakeman, 2009 and Hord and Bouck, 2012) have been conducted about teaching mathematic with special needs.

When the researches in literature are examined, it can be seen that the researches in the mathematics instruction generally focused school term students with special needs and researches related to the mathematics instructions

in the preschool term generally focused on the students without disabilities. So in the literature there are limited researches related to both mathematics instruction and preschool students with special needs and also there existed no reviews and meta-analysis studies on the methods used in mathematic teaching to preschool children with special needs. Considering these limitations, it is necessary to determine the quality methods that will be used to enable preschool children to gain basic concepts and skills in mathematic. Keeping all these points in mind, the aim of the study is:

1. Defining the articles instructing mathematics to the preschool students with a special needs.
2. Defining the instruction methods and programs using in preschool mathematics to the students with special needs.
3. Making descriptive analysis of the selected articles according to the specified criterions.

METHOD

In this research a qualitative approach is structured and descriptive analysis were used to analyze the criterions. The articles were searched articles beginning in 1990 and 2015 in the databases. First 59 articles were found related to mathematics instruction in preschool students with special needs. After analyzing the researches, 15 articles selected according to criterions which are using an instruction method or program for preschool students with special needs. In searched articles' participants were also selected as their special needs which are learning disability, discalculi, mental retardation, developmental delays, autism, down-syndrome etc. Because of the difficulties in defining student with special needs in the preschool term, students who defined low ability in mathematics after determining students with a scale are included to the participants. Searching procedure was used by Library Databases and electronical databases (EbschoHost, Proquest, National Thesis Centre (www.yok.gov.tr). In search also the key words used as "preschool students, mathematics education, special education, special needs, students with disability, early childhood, early numeracy, early number sense".

FINDINGS

The articles about mathematics instruction to the preschool students with special needs was analyzed with the specified criterions. The findings were presented in each title including different criterions.

The findings according to the scientific method.

In these 17 articles three different scientific methods were used. These are experimental studies, single case studies and qualitative studies. The numbers of articles using these scientific methods are shown in the Table 1.

Tablo 1. The number of articles using scientific methods

Research Model	Number of Articles
Experimental studies	12
Single Case Studies	4
Qualitative studies	1

According to Table 1, %70 of these articles about mathematics instruction about preschool students with special needs are experimental studies, %24 are single case studies and %4 are qualitative studies. The articles using experimental methods are shown in the following Table 2.

Table 2. The articles using experimental methods

Article	Number of participants	Type of Disabilities	Model	Independent Variable	Dependent Variable
Alfonso,2003	41	DD	Pretest-Posttest	Computer Games	Counting
Barbosa,2004	11	Autism DD MR	Pretest-Posttest	Microgenetic methodology	Matching Counting Computation
Aunio,Hautamäki & Van Luit,2007	90	At risk for LD(33), LD(12)	Pretest-Posttest	Let's Think Math	Number sense Counting Gometry
Baroody, Eiland & Thompson,2009	80	At risk for LD	Pretest-Posttest	Manipulatives Computer game	Number sense Aritmethic
Green,2014	50	DD	Pretest-Posttest	Preschool Numeracy Indicators	Early numeracy
Kroesbergen, Van Luit, Van Lieshout, Loosbroek & Van de Rijt, 2009	115	At risk for LD	Pretest-Posttest	Determining Math Abilities	Numeracy Language Executive Functions Subitizing
Reynolds,1994	1052	At risk for LD	Pretest-Posttest	CPC(Child parent center)	Counting Precondition Skills
Sood & Jitendra, 2011	61	At risk for LD	Pretest-Posttest	Number sense instruction	Number sense
Van Luit & Schopman, 2000	62	At risk for LD	Pretest-Posttest	Number sense instruction	Number sense
Velasco,2009	26	At risk for LD	Pretest-Posttest	Touchmath	Addition
Young-Loveridge, 2004	106	At risk for LD	Pretest-Posttest	Computer games Books	Early numeracy

According to table 2, most of the articles use pretest-posttest analyzing method for defining the effectiveness of their instruction methods. The articles using single case design are shown in Table 3.

Table 3. The articles using single case design

Article	Number of participants	Type of Disabilities	Model	Independent Variable	Dependent Variable
Daughterly, Grisham-Brown ve Hommeter, 2001	3	DD	Multiple Probe Design	Embedded Instruction-Constant Time Delay	Counting Colors
Davenport.2012	3	At risk for LD	Multiple Baseline Design	Embedded instruction	Numeracy
Krohn,Skinner, Fuller, 2012	4	At risk for LD	Multiple Baseline Design	Tape Assisted instruction	Discrimination of numbers
Öz, 2008	2	At risk for LD Speech Delay	Multiple Probe Design	Home based early intervention	Number Sense

According to the Table 3, there's no articles using a comparative model specialized as single case design. All of the articles aim to determine the effectiveness of their instruction methods. 2 the articles (%50) use multiple baseline design, 2 articles use (%50) multiple probe design. The articles using qualitative research models are shown in the following Table 4.,

Table 4. The articles using qualitative research model

Article	Number of participants	Type of Disabilities	Model	Independent Variable	Dependent Variable
Colker, etc. 1990	13	Mental retardation	Interview Presentation	Using video	Math and science ability

In the literature review there's only one article about an instruction method for preschool students with special needs. In this article Colker, etc (1990), interviewed thirteen students with mental retardation about their math concepts and presenting how to prepare a video format for teaching abstract skills as a concrete skills. The target population is also a large group of audiences in the articles.

The findings about participants

17 articles were analysed in this research and totally 1722 participants were participated to the researches. In only one article 2 parents were participated as instructor at home as a part of home based instructions. The other 1700 participants are preschool students with special needs. Some of the articles use control groups in their articles and the datas of these articles are shown in Table 5.

Table 5. The number of participants

Type of Participants	Number of Articles	Number of Participants
Experimental Group	17	1636
Control Group	3	84
Total	17	1720

However the other data is the age of participants, lots of articles couldn't give the age of each participants because of the huge number of participants. In this articles average age of the participants were given. All of the articles the age participants are in 4 to 7. According to the gender of the participants are shown in Table 6.

Gender of Participants	Number of Participants
Girl	570
Boy	998
Not defined	154
Total	1722

The other property is the participants' disabilities. In 17 articles students are categorized as Mental retardation, development delays, Autism, learning disabilities and being at risk for learning disabilities according to the standardized test scores. The number of students who are classified as their disabilities are shown in Table 7.

Table 7. The number of students with different types of deficiency

Type of deficiency	Number of prticipants
Mental retardation	15
Developmental delays	103
Autism	8
Learning disabilities	12
At risk for learning disabilities	1581
Normal	2 (Parents)
Total	1722

In Table 7 it's easily seen that most of the participants (%92) are at risk for learning disabilities. These participants are identified by the standardized test about math concepts and prerequisite skills. The other type of disabilities (%8) are less in the selected articles. This datas demonstrate the compliance with the literature which is claimed the difficulties of the diagnosing of the students before primary school.

The findings about dependent variables

In 17 articles the dependent variables are shown in Table 8.

Table 8. The findings about dependent variable

Dependent Variable	Number of Articles
Number Sense	8
Counting	5
Computation	2
Prerequisite Skills	3
Mathematics ability	1
Matching	1
Geometry	1
Mathematics vocabulary	1

According Table 8 number sense (%47) and counting skills (%29) are mostly used in the articles. These findings are compliance with the preschool mathematics program teaching to the preschool students. Using prerequisite skills (%18) as a dependent variable is also important for the literature because of its compulsory property.

The Findings about Reliability and Validity

Inter-observer reliability, generalization, maintenance and social validity datas were important for the literature of the feasibility and reliability of the and instructions' results. In this review these datas are analyzed from the articles. Using these datas are shown in the Table 9.

Table 9. The number of articles with reliability and validity data

Analysed Data	Number of Articles
Inter-observer Reliability	5
Generalization	5
Maintenance	8
Social Validity	2

According to Table 9, it's easily seen that maintenance datas (%47) are used in the articles. Interobserver reliability and generalization datas are used in 5 articles (%29) and social validity datas are used only in 2 articles (%12). When we analysed the articles, it's easily shown that the articles using single subject design are mostly used these datas in their researches and also only one articles using experimental designs is used these datas except social validity.

The findings about independent variables

Using an instruction method or a program are important for the preschool students with special needs. So in this research instruction methods and programs are analyzed. The findings of these datas are shown in Table 10.

Table 11: The number of articles about their results

	Instruction methods and programs	Number of Articles	Effectiveness
Instruction Methods	Direct instructions	1	+
	Touchmath	1	+
	Embedded instruction	2	+
	Using computer	2	+
	Using technology	1	+
	Constant time delay	1	+
	Tape assisted instruction	1	+
	Using manipulatives	1	+
	Using books	1	+
Programs	Microgenetic methodology	1	+
	Home based early interventions	1	+
	Preschool Numeracy Indicators	1	+
	Number sense instructon program	3	+
	Let's think (Adey et al.,2001)	1	+
	Math (Van Luit & Schopman, 1998)	1	+
	CPC (Child parent Center)	1	

In Table 11, it's easily seen that there's no commonly accepted instrucion methods and programs in teaching

mathematics to the student with preschool students with special needs. But if we accept computer as a technology using technology is mostly used in the articles (%18) and as a program number sense instruction program is also mostly used in the articles (%18). The important findings of this research is the results of the articles. All of the instruction methods and programs are found as effective to teaching mathematics skills to the preschool students with special needs.

CONCLUSIONS

The aim of this research is searching the literature which is related teaching mathematics to the preschool student with special needs and defining their research models, participants, instructional methods and dependent variables. According to these aims there are lots of important findings to contribute the literature. Firstly, however there are lots of articles about preschool math education, but there are limited articles about instruction preschool math to the students with special needs. This findings are contribute the misconceptions in the literature as teaching mathematics is not priority aim with the students with special needs. This is also important for the future studies. The other findings are; however single subject design is most commonly used method as a research model in special education, there are a few articles using single subject design. It is suggested that articles using single subject design must increase in the future researches. The last important way of this research is the type of the participants' disabilities. In literature there are lots of articles claiming the difficulties of the diagnosing the students before the school life. According to this research's findings, students at risk for learning disability is the largest group in all participants and most of these participants diagnosed by the researchers of these articles by the standardized test. Therefore this finding is important for defining this problem of special education and the articles diagnosing preschool students must increase in the future researches.

References

- Aktaş- Arnas, Y. (2005). *Okulöncesi Dönemde Matematik Eğitimi*. Ankara: Nobel Kitabevi.
- Alfonso, V.C. (2003). Mathematics instruction and practice: teaching young children with developmental delays, Fordham University.
- Aunio, P., Hautamäki, J. and Van Luit, J.E.H. (2007). Mathematical thinking intervention programmes for preschool children with normal and low number sense, *European Journal of Special Needs Education*, 20:2, p. 131-146.
- Barbosa, H.H.J. (2004). Numerical abilities in preschool children with atypical Development: a developmental description, Lesley University
- Baroody, A.J., Eiland, M. and Thompson, B. (2009). Fostering At-Risk Preschoolers' Number Sense, *Early Education and Development*, 20:1, p.80-128.
- Browder, D. M., Spooner, F., Ahlgrim- Delzell, L., Harris, A.A., Wakeman, S. (2009). A meta- analysis on teaching mathematics to students with significant cognitive disabilities. *Exceptional Children*. 74 (4), 407-432.
- Butler, F. M., Miller, S. P., Lee, K., & Pierce, T. (2001). Teaching mathematics to students with mild-to-moderate mental retardation: A review of the literature. *Mental Retardation*, 39, 20 –31.
- Clarke, B., Baker, S., Smolkowski, K. and Chard, D.J. (2008). An Analysis of Early Numeracy Curriculum-Based Measurement Examining the Role of Growth in Student Outcomes, *Remedial and Special Education* V.29 N.1, p. 46-57.
- Daugherty, S., Grisham-Brown, J. L., Hemmeter, M. L. (2001). The effects of embedded skills instruction on the acquisition of target and non-target skills in preschoolers with developmental delays. *Topics in Early Childhood Special Education*, 21, 213-221.
- Davenport, L.A. (2012). Numeracy in inclusive early childhood classrooms: embedding learning opportunities and using effective instructional strategies, University of Utah.
- Green, K.B. (2014). The effects of the integration of mathematics within children's literature on early numeracy skills of young children with disabilities, Georgia State University.
- Hord, C., & Bouck, E. C. (2012). Review of academic mathematics instruction for students with mild intellectual disability. *Education and Training in Autism and Developmental Disabilities* , 389 – 400.
- Kroesbergen, E.H., Van Luit, J.E.H., Van Lieshout, E.C.D.M., Loosbroek, E. and Van De Rijt, B.A.M. (2009). Individual Differences in Early Numeracy: The Role of Executive Functions and subitizing, *Journal of Psychoeducational Assessment*.
- Krohn, K.R., Skinner, C.H., Fuller, E.J. and Greear, C. (2012). Using a taped intervention to improve kindergarten students' number identification, *Journal of applied Behavior Analyses*, 45:2, p.437-41
- MEB Okulöncesi Eğitim Programı 2013, Ankara.
- Öz, A.Ş. (2008). Computer-supported collaborative learning between children and parents: a home-based early intervention study to improve the mathematical skills of young children at risk for learning disabilities, Indiana University.

- Patterson, D.R. (2014). Effects of direct instruction on acquisition of early elementary mathematical vocabulary by students with autism, The University of North Carolina.
- Valesco, V. (2009). Effectiveness of Touch Math In Teaching Addition to Kindergarten Students.
- Xin, Y. P., Grasso, E., Dipipi-Hoy, G. M., & Jitendra, A. (2005). The effects of purchasing skills instruction for individuals with developmental disabilities: A metaanalysis. *Exceptional Children*, 71, 379-400.
- Young-Loveridge, J.M. (2004). Effects on early numeracy of a program using number books and games, *Early Childhood Research Quarterly*, 19:1, p.82-98.

The Investigation Of The Effect Of Computer And Technology Supported Teaching Applications On Students' Accessibility About The Teaching Of The Topic Of Energy

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ABSTRACT

In this research, effectiveness of computer and technology supported teaching applications on students' accessibility about the subject of "energy" in grade 9 was studied. 90 students from different classes in a public school in the centre of Ankara were used as 2 control and 2 experiment groups, which constituted the research sample in the second semester of 2013-2014 educational year. The survey was a semi-experimental study based on the 'Control Group Pre-test and Post-test Model'. According to Fraenkel and Wallen (2006) experimental researches are the most valid and reliable ways to observe the effects of the variable and to test the cause and effect relationships. "Accessibility test of the topic of energy" prepared by the researchers was used as a means of collection of data. Pre-test before the intervention, post-test after the intervention, and retention test 4 weeks after the application were applied. For statistical analysis of the collected data, descriptive statistical methods (mean, \pm standard deviation, percentage) as well as independent samples T-test, one-way ANOVA and LSD test cross-table were used. As a result of analysis, it was found that, both post-test results of the students in the experimental group, in which computer and technology supported lessons were carried out, and post-test results of the students in the control group showed a statistically important increase. However, while the increase was found to be % 189 among the group of students where computer and technology supported lessons were carried out, it was found to be % 128 among the other group where regular educational program was carried out. According to retention test applied to both groups, 4 weeks after the intervention, while the loss found to be % 2.3 for the group of students where computer and technology supported lessons were carried out, it was found to be % 9.5 for control group where regular educational program was carried out. Thus, it was concluded that, comparing with classical teaching applications, computer and technology supported teaching practices were more effective on increasing students' accessibility and maintaining retention.

Key words: Technology supported teaching, students' accessibility, retention

INTRODUCTION

Continuous changes of the societal structure and rapid improvements in science and technology influence education system and entails new approaches. The uppermost approach to the education is to utilize computers, which are considered as the most effective means of communicating and personal teaching. In these early days of the 21st century of information society, we enjoy important developments from definition of trained person to content of education and increase and diversification of sources of knowledge to the newest methods of teaching and learning. Computer assisted learning media expands rapidly and is getting effectively used. As one of the purposes of education is to grow individuals in line with society's requirements, there raises an obligation to train students, keeping in mind the feature of information societies.

Since computers allow features such as personal learning rates, active participation, immediate correction, gradual advance, they stay ahead of the other teaching tools (Çepni vd., 2006). Applications related to using computer as a means of learning-teaching in activities like directly communicating contents of courses, repeating learnings received through other methods, problem solving, doing researches are called "computer assisted education". It is possible to develop various types of materials that address to more sense organs if technology is

used, therefore one of the major contributions of technology for education is about preparing course materials (Sönmez, 2003). On the other hand, Hannafin and Peck (1989) defines computer assisted teaching as transmitting educational contents or activities to the student via computer. Computer incorporates into teaching process not as an alternative to teacher but a supplementary and strengthening tool to the system. In science literature, there are studies already done with respect to influence of computer and technology assisted teaching on students' success and behavior (Öz, 2002; Çepni, Taş & Köse, 2006; Olgun, 2006; London, 2005; Wilder, 2006; Kahraman, 2007).

When it comes to contents, especially science courses are convenient for applications of computer assisted teaching. This is because, scientific concepts and principles are mainly contained in these courses and appropriate teaching techniques may be utilized as visuals during development stage of course softwares. Also, computer assisted teaching is effective in terms of gathering attention especially during science courses, when compared to other techniques, as findings suggest (Hounshell & Hill, 1989). It has been identified that students in the experimental group, to whom computer assisted teaching was applied during Kahvecioğlu's (2007) visual arts course, became academically more successful compared to students in the control group, to whom conventional teaching method was applied. According to Cüez (2006), for 8th graders, e-enabled science teaching is effective comparing to the conventional method. Demirer (2006) concluded in her study applied to the secondary students that computer assisted science teaching is effective over conventional method in terms of acquisition, permanence and student's success.

Permanence of the information learned plays a fundamental role for students' academic success (Tatar, 2006). We should prefer information that may be used in daily lives and will be remembered for a long period of time rather than information to be immediately forgotten or memorized only (Yaman, 2003). Aim of this research is to determine impact of computer and technology assisted teaching on students' acquisitions and permanence of information, in the course of teaching "ENERGY" subject to the 9th graders.

METHOD

Study Model

This research, examining the influence of "computer and technology assisted teaching" on determining 9th graders' academic levels in reference to "energy" topic and enhancing these levels, is a quasi-experimental research based on the "Control Group Pre-test and Post-test Design".

Study Group

Study group of this research includes 9th grader students of 90, from 4 different classes by the same teacher who taught during 2013-2014 educational year in Ankara, in a public school affiliated to the Ministry of National Education. In this study, a computer and technology assisted teaching program has been applied to the experimental group. This application lasted for four weeks and 12 courses. 15 open-ended questions, developed for the first time and tested against validity and reliability by the researchers, were asked to the experimental and control groups. At the end of this application, two classes with the lowest and the highest average points were designated as control group, while the other two classes with intermediate average points have been designated as the study group, thus forming two groups with equal average points. After four weeks following the process, the post-test was applied. And after four weeks following the post-test, the same 15 open-ended questions were applied; results didn't change. A and B classes of the experimental group included 43 students, while C and D classes of the control group included 47.

Data Collection Tool

In this study where impact of computer and technology assisted teaching application on teaching the topic of energy to the 9th graders, 15 open-ended questions developed by the researches has been used as the data collection tool. Before preparing these questions, energy section included in the reference book of the course was examined, and a form including 25 questions was created. This form of questions was reviewed by 3 professors and 1 teacher, before the final version. Each question is 10 points.

Analysis of Data

Descriptive statistical techniques like arithmetic mean, standard deviation, frequency and percentage were used for analysis of data, Mann Whitney's U-test was used for testing significance of differences between pre-test and post-test points of the control and experimental groups, and Wilcoxon signed-rank test was used for testing relationships between dependent variables. Significance level of the research was decided as 0.05.

FINDINGS

Exclusively, impact and permanence of computer and technology assisted teaching application on teaching energy topic to the 9th graders were identified in this section. In Table 1, data in relation to the pre-test, post-test and permanence of experimental and control groups.

Table 1: Experimental and Control Groups Test Results

	Experimental Group		Control Group	
	\bar{x}	Standard Deviation	\bar{x}	Standard Deviation
Pre-test	42.58	19.82	42.85	18.79
Post-test	123.16	12.07	97.85	20.12
Permanence Test	117.79	12.91	87.49	21.52

Based on results of analysis, for experimental and control groups, pre-test averages are closer, while post-test and permanence averages differ. Statistical analysis of these identified differences are shown in Table 2.

Table 2: Comparison of Pre-test Results of Experimental and Control Groups

	Research Groups	N	Mean Rank	Mann-Whitney U	Z	p
Pre-test	Experimental Group	43	45.28	1001.000	-,077	,939
	Control Group	47	45.70			

Significance of difference between average points of pre-test of experimental and control groups was analyzed, and the difference identified in the pre-test was found to be statistically insignificant ($p>0.05$).

Table 2.1 Comparison of Post-test Results of Experimental and Control Groups

	Research Groups	N	Mean Rank	Mann-Whitney U	Z	p
Post-test	Experimental Group	43	62.05	299.000	-5.756	0.000
	Control Group	47	30.36			

Based on the comparison of analysis results, a statistically significant difference was found between the experimental and control groups ($p<0,05$). It can be construed from this finding that computer and technology assisted education is more effective compared to the conventional education method, considering students' academic success.

Table 2.2 Comparison of Pre-test and Post-test of Experimental Group

		N	Mean Rank	Z	p
Pre-test*Post-test	Negative Rank	43	22		
	Positive Rank	0	0	-5.712	0.000
	Even	0			

According to Wilcoxon sign-rank test carried out to examine the difference brought by the education system applied, there is a statistically significant difference between pre-test and post-test averages of the experimental group. This difference is in support of the post-test, and this proves that education system applied to the experimental group is effective.

Table 3: Comparison of Experimental and Control Groups in Permanence Test

	Research Groups	N	Mean Rank	Mann-Whitney U	Z	p
Permanence	Experimental Group	43	63.36			
	Control Group	47	29.16	242.500	-6.212	0.000

For the comparison of permanence test results between experimental and control group, difference between two study groups has been found to be statistically significant ($p < 0,05$). When it comes to mean rank of the control group, value is found to be higher. Briefly, permanence test average of the experimental group is higher than the control group, and since this difference is significant, it can be interpreted that, on statistical permanence basis, computer and technology assisted education helps students keep information in mind for a much longer period. Pre-test and post-test data belonging to each class of experimental and control groups are presented in Table 4.

Table 4: Averages of Pre-test and Post-test by Classes

	Experimental Group				Control Group			
	Class A		Class B		Class C		Class D	
	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD
Pre-test	37.45	18.68	47.95	19.97	33.50	11.20	51.08	20.40
Post-test	116.45	11.27	130.19	8.44	79.55	10.92	113.96	9.68
Permanence Test	111.36	11.70	124.52	10.65	69.36	12.22	103.44	13.81

If Table 4 is examined, it can be understood that post-test mean points of experimental and control groups are higher than the pre-test mean points. Yet, academic success is improved better in classes included in the experimental group rather than control group. When increases in pre-test and post-test averages of classes A and C (the lowest mean points) of the experimental and control groups are analyzed, the academic success increase of class A in the experimental group is found %210,95, while class C in the control group is %137,46.

CONCLUSIONS

As a conclusion, while teaching "Energy" topic, a significant difference has been determined in terms of post-test academic success results between the students of experimental group, to whom computer assisted teaching method was applied and those in the case of conventional teaching methods. This difference has been identified in support of the students in the experimental group, to whom computer assisted teaching method was applied. In other words, academic success results from the post-test of the students of experimental group who received computer assisted education is higher, compared to the students of control group who received conventional education. Based on these results, while teaching science, computer assisted teaching method is more effective than the conventional teaching method, as may be inferred from students' increased academic results.

It may be seen from the relevant literature that computer assisted teaching is effective on students' success. This result is confirmed through a number of researches of various fields and levels, in Turkey and foreign countries (Yenice, 2003; Hançer, 2007; Akçay, Aydoğdu, Şensoy & Yıldırım, 2005; Pektaş, Solak & Türkmen, 2006; Yiğit & Akdeniz, 2003; Çepni, Taş & Köse, 2006; Reed, (1986) ; McCoy, 1991; Traynor, 2003; Dockery, 2006; Liao, 2007). From these researches, it has been understood that using computers for educational purposes significantly increase success rates, while teaching science. These results prove the results of this research.

RECOMMENDATIONS

Especially while teaching science topics, using computer assisted teaching method will help students materialize abstract concepts and provide meaningful learning, and will give chance to apply and consolidate what they've learned. The more sense organs students use, the more effective and permanent the learning will be. For this reason, teachers should utilize teaching methods and tools for their students and ensure that teaching focuses on as many sense organs as possible (Akçay vd.).

References

- Akçay, S., Aydoğdu, M., Şensoy, Ö. & Yıldırım, H.İ. (2005). *Fen Eğitiminde İlköğretim 6.sınıflarda Çiçekli Bitkiler Konusunun Öğretiminde Bilgisayar Destekli Öğretimin Öğrenci Başarısına Etkisi*. Kastamonu Eğitim Dergisi, 13(1), 103-116.
- Cüez, Tuba. (2006). "İlköğretim 8. Sınıflarda Fen Bilgisi Dersinde Web Tabanlı Öğretim Desteğinin Öğrenci Başarısına Etkisi." Yayınlanmamış Yüksek lisans Tezi, Dokuz Eylül Üniversitesi Eğitim Enstitüsü, İzmir.
- Çepni, S., Taş, E. & Köse, S. (2006). *The Effects of Computer Assisted Materials on Students' Cognitive Levels, Misconceptions and Attitude Toward Science*. Computers and Education, 46, 192-205.
- Demirer, Aynur. (2006). "İlköğretim İkinci Kademedeki Bilgisayar Destekli Fen Bilgisi Öğretiminin Öğrenci Başarısına Etkilerine İlişkin Bir Araştırma Şehit Namık Tümer İlköğretim Okulu Örneği." Yayınlanmamış Yüksek lisans Tezi, Dicle Üniversitesi Sosyal Bilimler Enstitüsü, Diyarbakır.
- Dockery, J. A. (2006). *The Effectiveness of Computer Assisted Instruction in preparing academically at risk students for the Georgia High School Graduation test*. Workforce Education Forum, Chapella University, 120.
- Hançer, A.H. (2007). *Fen Eğitiminde Yapılandırmacı Yaklaşımına Dayalı Bilgisayar Destekli Öğrenmenin Kavram Yanılgıları Üzerine Etkisi*. Cumhuriyet Üniversitesi Sosyal Bilimler Dergisi, 31, 69-81.
- Hannafin, M.S. & Peck, K.L. (1988). *The Design, Development and Evaluation of Instructional Software*. MacMillan, Londra.
- Hounshell, P.B. & Hill, S.R. (1989). *The microcomputer and achievement and attitudes in high school biology*. Journal of Research in Science Teaching, 26(6), 543-549.
- Kahraman, Ö. (2007). *İlköğretim 7.sınıf fen bilgisi dersi fizik konularının öğretilmesinde bilgisayar destekli öğretimin öğrenci tutum ve başarısına etkisi*. Yayınlanmamış Yüksek Lisans Tezi, Pamukkale Üniversitesi Fen Bilimleri Enstitüsü, Denizli.
- Kahvecioğlu, Nesli Simge. (2007). "İlköğretim II. Sınıf Görsel Sanatlar Dersinde Bilgisayar Destekli Öğretim Ve Geleneksel Öğretim Yöntemlerinin Öğrenme Üzerindeki Etkisinin Karşılaştırılması". Yayınlanmamış Yüksek lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- Liao, Y. C. (2007). *Effects computer assisted instruction on students' achievement in Taiwan: A meta analysis*. Computer and Education, 48, 216-233.
- London, N. (2005). *A field test of CAI software: A journey through the solar system*. Yayınlanmamış Yüksek Lisans Tezi, California State University, California.
- McCoy, L. , P. (1991). *The effect of geometry tool software on high school geometry achievement*. Journal of Computers in Mathematics and Science Teaching, 10, 51-57.
- Olgun, Akif. (2006). "Bilgisayar Destekli Fen Bilgisi Öğretiminin Öğrencilerden Fen Bilgisi Tutumları, Bilişüstü Becerileri ve Başarıya Etkisi". Osmangazi Üniversitesi Fen Bilimleri Enstitüsü, Yayınlanmamış Yüksek lisans Tezi, Eskişehir.
- Öz, Özgür Öner. (2002). "İlköğretim 6. Sınıflarda Fen Bilgisi Dersinde Uzayı Keşfediyoruz Ünitesinin Öğretiminde Bilgisayar Destekli Öğretimin Öğrenci Başarısına Etkisi," Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Yayınlanmamış Yüksek lisans Tezi, Adana.

- Pektaş, M., Solak, K., & Türkmen, L. (2006). *Bilgisayar Destekli Öğretimin Fen Bilgisi Öğretmen Adaylarının Sindirim Sistemi ve Boşaltım Sistemi Konularını Öğrenmeleri Üzerine Etkisi*. Kastamonu Eğitim Dergisi, 14(2), 465-472.
- Reed, B. (1986). *The Effects of Computer Assisted Instruction on Achievement and Attitudes of Underachievers in High School Biology*. Dissertation Abstracts International, 47 (4), 1270A.
- Sönmez, V. (Ed). (2003). *Öğretmenlik mesleğine giriş*. Anı Yayıncılık, Ankara.
- Tatar, Nilgün. (2006). *“İlköğretim Fen Eğitiminde Araştırmaya Dayalı Öğrenme Yaklaşımının Bilimsel Süreç Becerilerine, Akademik Başarıya ve Tutuma Etkisi.”* Yayınlanmamış Doktora Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- Traynor, L. P. (2003). *Effects of Computer -Assisted- Instruction on Different Learners*. Journal of Instructional Psychology, June.
- Wilder, D. M. (2006). *A field test of CAI software: introduction to electricity*. Yayınlanmamış Yüksek Lisans tezi, California State University, California.
- Yaman, Süleyman. (2003). *“Fen Bilgisi Öğretiminde Probleme Dayalı Öğrenmenin Öğrenme Ürünlerine Etkisi,”* Yayınlanmamış Doktora Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- Yenice, N. (2003). *Bilgisayar Destekli Fen Bilgisi Öğretiminin Öğrencilerin Fen ve Bilgisayar Tutumlarına Etkisi*. The Turkish Online Journal of Educational Technology, volume 2, issue 4, article 12.
- Yiğit, N. & Akdeniz, A. R. (2003). *Fizik Öğretiminde Bilgisayar Destekli Etkinliklerin Öğrenci Kazanımları Üzerine Etkisi*: Elektrik Devreleri Örneği. Gazi Üniversitesi Eğitim Fakültesi Dergisi, 23(3), 99-113.

The Mechanics Of Rigid Bodies In Mechanical Engineering Education

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ABSTRACT

The mechanics of rigid bodies is the foundation of most engineering sciences and is an indispensable prerequisite to their study.

The purpose of rigid body mechanics courses is to provide engineering students with ability to analyze any problem in a simple and logical manner and to apply to its basic principles which are few and well-understood for solutions. Therefore, it has an important role in engineering education.

The mechanics of rigid bodies is subdivided into statics and dynamics. Statics deals with rigid bodies at rest, dynamics deals with rigid bodies in motion. In this paper, engineering curriculum followed by the Turkish Universities has been examined as per their programmes of the statics and dynamics courses covering the knowledge of the mechanics of rigid bodies. The statics and dynamics course programmes which are necessary for the mechanical engineering have been evaluated regarding the international accreditation criteria.

Keywords: The mechanics of rigid bodies, statics, dynamics, mechanical engineering

INTRODUCTION

Mechanic is a discipline that examines and describes balance and action conditions of things under various forces is basis of engineering education. Mechanics starts with the results that are obtained from observations and tries to define the unvarying correlations between various elements of a physical event. The proposed laws are based on various assumptions. (Beer F.P. , Johnston E.R. , 2004).

The mechanic is the first science branch. The history of Statics goes back to ancient times but its basement on scientific foundation is new. For instance, the principle of parallelogram is proposed by Simon Stevinus (1548-1620). The history of Dynamics is newer than Statics. Although it goes back to Galileo Galilei (1564-1642), the serious foundations that survived until today were laid by Isaac Newton (1642-1726). The Mechanics is founded on 3 basic laws of Newton but has been developed with the collaborations of many scientists like D'Alembert (1717-1783), Lagrange (1736-1813), Hamilton (1805-1865), and Jakobi (1804-1851).

Mechanic is divided in two as follows;

- Rigid (stable, indeformable) bodies mechanic,
- Deformable materials mechanics,

The rigid bodies mechanics is the discipline that handles the behaviors of rigid bodies under force.

- Rigid bodies statics
- Rigid bodies dynamics

The rigid bodies statics studies the bonding force that affects the static balanced bodies and their balance conditions but the rigid bodies dynamics studies the motion of bodies by using equations of motion. Dynamics is subdivided into two main fields as kinematics and kinetics. Kinematics is the study of motion without taking into account the reasons that form motion that is the forces. Kinetics is the study of forces that drive one bodies, and the relations between that force, the mass of bodies, and the motion produced (Hibbeler R.C., 1978).

THE MECHANICS OF RIGID BODIES IN MECHANICAL ENGINEERING EDUCATION

Mechanic education composes basis of Mechanical Engineering education as it is understood from its title. When student has completed his/her mechanical engineering education then he/she will be considered to learn mechanical discipline theoretically and practically. In the case of not understanding mechanics due to any reason, then it is inevitable that the young engineer will always feel incompetent, concerned and anxious.

Basic principles of mechanics at Mechanical Engineering Education Course Plans are taught primarily at the courses including rigid body mechanics knowledge. Objective of Rigid Bodies' Mechanics Course is to provide engineering students with the ability of analyzing every problem simply and logically and to apply less number and well understood basic principles for resolutions. Therefore, it is seen that "statics" and "dynamics" courses of rigid body's mechanics are included in Education plans as two different obligatory basic engineering courses. The students with that basic mechanics information in the first periods of engineering education learn strength course, solid body mechanic and fluid mechanics principles. They continue to use those basic information at also other engineering courses.

Mechanics of Rigid Bodies; Static Course

Static course that is introductory course to mechanic provide students to meet firstly to engineering term. Today many physical events that we observe frequently in daily life are tried to be approached with engineering formation view and tried to be transferred to the minds.

Static course included in course plans of Mechanical Engineering Departments of Turkish Universities in the scope of obligatory course of which 75% is shown in the second semester, 25% is shown in the third semester. (Figure 1)

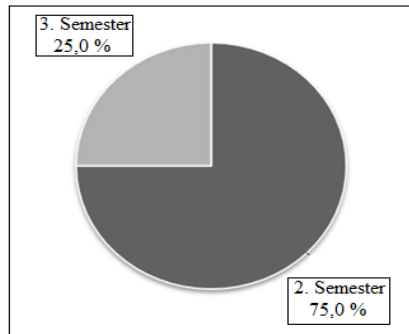


Figure 1. The semesters of Static course

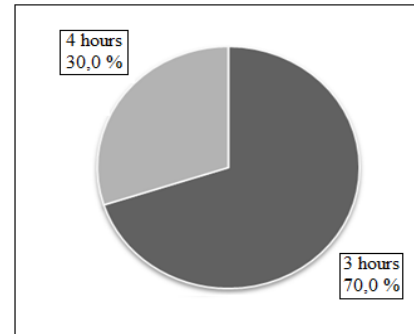


Figure 2. Static course hours weekly

70% of Static Course Engineering department Education plans are 3 hours in a week and 30% is 4 hours in a week. (Figure 2)

ACTS distribution at Static course varies between 4 and 9 credit. (Figure 3).

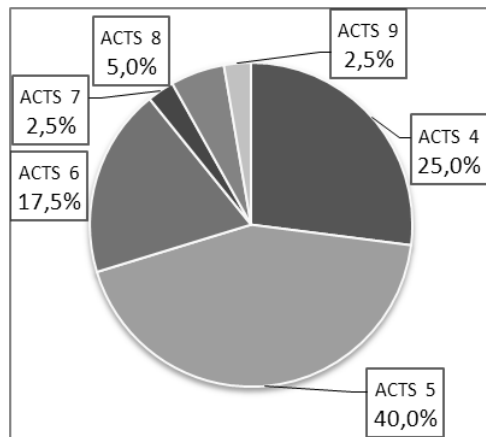


Figure 3. Static course ACTS Credits

Table 1. Static course weekly subjects

Week	Subjects
1	Introduction to Mechanics
2	Statics of Particles: Forces in Plane
3	Statics of Particles: Forces in Space
4	Rigid Bodies: Equivalent System of Forces
5	Rigid Bodies: Equivalent System of Forces
6	Equilibrium of Rigid Bodies
7	Distributed Forces: Centroids and Centers of Gravity
8	First Midterm
9	Analysis of Structures
10	Forces in Beams and Cables
11	Friction
12	Equilibrium of Rigid Bodies Systems
13	Distributed Forces: Moment of Inertia of Masses
14	Second Midterm
15	Method of Virtual Work.
16	Final Exam

Static Course Learning Outcomes:

- Students shall gain knowledge about center of gravity and may solve related problems
- To gain knowledge about equilibrium of particles and rigid bodies
- Students shall gain knowledge about bonding and bonding forces
- Students shall gain specific information about equilibrium of structures (beams, trusses, frames, cables, machines)

Mechanics of Rigid Bodies; Dynamic Course

In engineering training, the teaching of dynamics in which behaviors of objects are studied generally comes after study of statics. The kinematics and kinetics that are the subdivisions of dynamics must be precisely learned in engineering to be able to get the powerful tool of analysis. Since the machines start at high speeds and at significant accelerations, the calculations required to be made according to the laws of dynamics instead of statics. The technological development of today on speed requires more implication of mechanical principles and especially the dynamics. Those principles are the basis for design and analysis of all moving objects, fixed structures that are subject to specific impact conditions, robotic equipment, automatic control systems, vehicles, pumps, turbines, cranes, and etc. (Meriam J. L., Kraige L.G., 2008).

It is necessary to learn dynamics to be able to understand, define, and make analysis of motions of objects with continuous transitions between physics and mathematics. The students, who could not understand the dynamics lectures, would face the problem of inadequacy to freely make these transitions.

Dynamic course is included in the third year in 65% rate, in the fourth year in 32.5% rate, in the fifth year in 2.5% rate in Mechanical Engineering Departments' Education Plans(Figure 4). Weekly dynamic course dispersion varies from 2 to 5 hours (Figure 5).

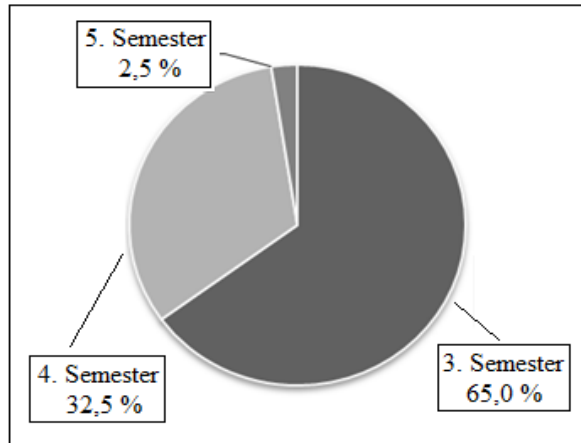


Figure 4. The semesters of dynamic course

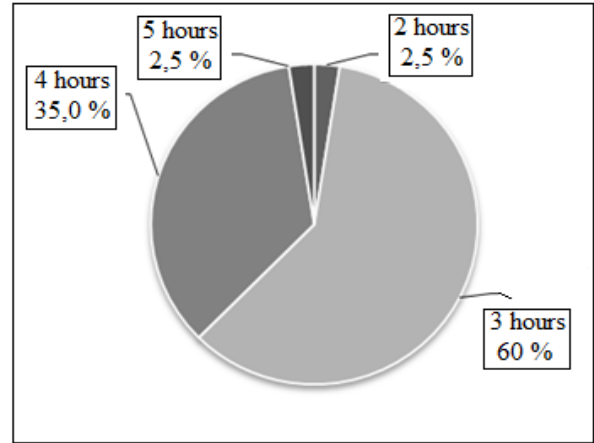


Figure 5. Dynamic course hours weekly

ACTS distribution at Dynamic course varies between 3 and 6 credit. (Figure 6).

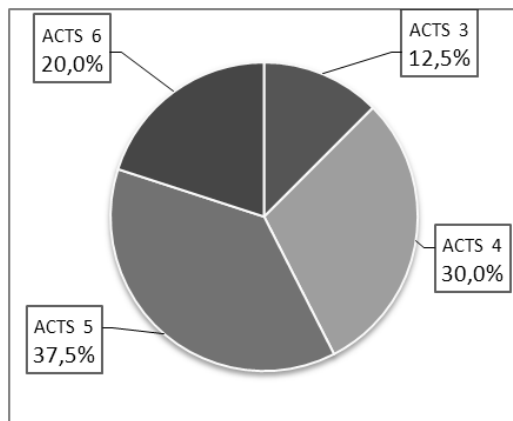


Figure 6. Dynamic course ACTS Credits

Table 2. Dynamic course weekly subjects

Week	Subjects
1	Introduction to Dynamics
2	Rectilinear Motion of Particles
3	Curvilinear Motion of Particles
4	Curvilinear Motion of Particles
5	Kinematics of Rigid Bodies
6	Kinematics of Rigid Bodies
7	Kinematics of Rigid Bodies
8	1st Midterm Exams
9	Kinetics of Particles; Force, Mass and Acceleration
10	Kinetics of Particles; Work, Energy and Momentum
11	Kinetics of System of Particles
12	Plane Motions of Rigid Bodies; Forces and Accelerations
13	Plane Motions of Rigid Bodies; Work and Energy
14	2nd Midterm Exam
15	Plane Motions of Rigid Bodies; Impulse and Momentum
16	Final Exam

When the distribution of dynamics lectures between weekly curriculums is studied, it is observed that there are some differences between schools in terms of their lecturing plans. The plan that is given above for lecturing during 15 weeks period has been found to be the more understandable by the students and it is observed that this plan saves time at lectures.

Dynamics Course Learning Outcomes:

- To be able to select and use an appropriate coordinate system to describe particle motion
- To be able to formulate dynamics models in accelerating frames
- To be able to identify and exploit situations in which integrated forms of the equations of motions, yielding conservation of momentum and/or energy for the particles and rigid bodies
- To be able to formulate and analyze dynamics of bodies in plane motion

RESULTS AND DISCUSSIONS

When instructional plans of Mechanical Engineering Departments in our country are examined, it is seen that statics course is studied mostly in the 2nd semester and dynamics course is studied in the next, 3rd semester.

Both courses are generally 3 hours in a week. It is proven to be appropriate to lecture statics and then dynamics courses just after the basic courses in the first semester.

Amendments are applied to Instructional Plans of the Mechanical Engineering Departments continuously, in terms of the number of courses and credit hours with a content of contemporary and international criteria.

Since providing the quality assurance in university education becomes imperative in a Europe where borders between countries removed, the success of universities and their diplomas are supposed to be recognized mutually in the European scale within the framework of the Bologna process.

In the context of the Bologna process, when course lesson plans of the Mechanical Engineering Departments of the Universities are compared, lesson titles, content and credits are not much different from each other. The mechanics of rigid bodies lessons also have the same situation.

Does Rigid Bodies Mechanics get the attention it deserves within Mechanical Engineering Education? If the answer is 'YES' then we could consider that there has been serious progress in these two fields. Firstly, we are educating students who are fully equipped to detect the mechanical problems which are part of his/her profession and analyze them from the engineering perspective. Secondly, the mathematical substructure and quick thinking skills needed for solving mechanical problems have been gained by the students.

References

- Beer F.P., Johnston E.R..(2004). Vector Mechanics for Engineers: Statics, Seventh Edistion, ISBN 0-07-230493-6, Mc Graw Hill.
- Hibbeler R.C..(1978). Engineering Mechanics: Statics., 2nd Edition, ISBN 0-02-354020-6, New York.
- Beer F.P., Johnston E.R..(2004). Vector Mechanics for Engineers: Dynamics, Seventh Edistion, ISBN 0-07-230492-8, Mc Graw Hill.
- Meriam, J. L., Kraige, L.G..(2008). Engineering Mechanics: Dynamics, Sixth Edition, ISBN-13: 978-0471787037, New York.

The Place Of Madrasas In The History Of Turkish Education

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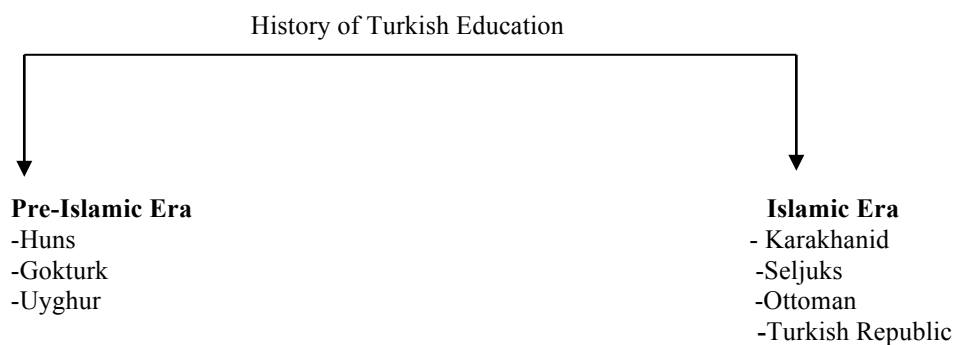
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ABSTRACT

History of education is also history of humanity. Every nation has its own history. In this paper, the history of Turkish education was examined. In this context, the importance of madrasas was the main subject of this paper. In doing this, it was also examined the history of Turkish education in both pre-Islamic era and Islamic era. It can be seen that after accepting Islam religion, the Turkish educational system was mainly changed and madrasas was appeared as a sign of formal education. In the beginning, madrasas were only Muslim theological schools; but later they affected on all Turkish educational system, especially in Seljuks and Ottoman, until the foundation of Turkish Republic. Along with the foundation of new state, Turkish Republic, madrasas were closed with the law on unification of education because of their degenerations.

INTRODUCTION

Education cannot be defined easily, so it can be found many answers about what education is. In its narrow sense, education means school instruction, while in its wider sense, it means the total development of the personality. In general sense, education is any act or experience that has a formative effect on the mind, character or physical ability of an individual. The history of education is the history of man. Every nation has its own history of education. Generally, the educational history of a nation mainly deals with instructional and educational activities from a historical perspective. The history of Turkish education goes back to early centuries. In history of Turkish education can be divided into two main eras: Pre-Islamic Era and Islamic Era. It can be found the division of the history of Turkish education in the following schema:



PRE-ISLAMIC ERA

In pre-Islamic era, there were three Turkish states; Huns, Gokturks and Uyghurs. Education in these states was based on culture. There was no any formal education. Families were responsible to educate their children. "Fathers educate their sons and mothers educate their daughters". In this time, education meant development of personality not school instruction. In pre-Islamic era, Turkish education system was mainly based on morality and vocational education was important. Education of Turks before Islam was shaped with their life style.

ISLAMIC ERA

After their conversion to Islam, the life styles and educational systems of Turks were mainly changed. In Islamic era, it can be found important Turkish states such as Karakhanids, Seljuks, Ottoman and Turkish Republic. The most important change in education after accepting Islam was the starting of formal education and the foundation of madrasas as a formal educational institutions.

The name of madrasa means class. In Islam world, it was an educational institution. Madrasas had very important place in history of Turkish education and Islam world. The first roots of madrasas were mosques. In Islam world, education was given in mosques firstly. This education was equal to elementary level. Madrasas were Muslim theological schools, founded after accepting Islam. In the beginning of the history of Islamic education, small mosques were the center of education; but over time they began to fail for education. Hereafter, madrasas were founded.

The first Turkish Islamic state was Karakhanids, so formal educational institutions such as Madrasas can be seen in Karakhanids firstly. Madrasas had very important place in Karakhanids and they had three functions: One of the functions of madrasas was to reinforce of new belief. The other and may be the most important function of

madrastas was to protect Sunni-Hanefi communion againsts to other communions. In Karakhanids, madrasa was a venue for both scientist and clergymen. The teacher of madrasa was called Fakih and he must be Hanefi communion. All students of madrasa should also be Hanefi communion.

Farabi and Ibn-i Sina suggested ideas about education in this time. For Farabi, the aim of education is happiness and to rehabilite people for society. There are 3 kinds of educators for him. These are: Head of the family, Teacher and Sovereign. He separeted teaching and education. For Ibn-i Sina the first education of child is moral education and playing is also important in education.

SELJUKS

In Seljuks, mosques and prayer rooms, places, libraries, ahi-order organization etc. were common-public educational institutions. Schools (mektep) and madrasas were formal educational instutions. Schools (mektep) had a level of elementary school, and they were called also *kuttap*. They were founded near mosques. Students learned how to write and read in these schools. It was an important institution. Madrasas also had an important place and rapidly spread in Seljuks because of the following reasons:

- 1-One of the duties of madrasas was to spread and prevent Hanefi communion to other communions.
- 2- To need education personnel in the government.
- 3-To need educating Muslim scholars.
- 4-They needed to educated people for the sake of the state.
- 5-Madrasas were used to reintroduce poor students to society.
- 6- The disposition of statesmen towards arts and science.

Higher education began with madrasas in Seljuk. One of the most important madrasa was Baghdad Nizamiye Madrasa. Baghdad Nizamiye Madrasa was a higher education institution. Madrasas were first founded in 10th century. Nizam'ul Mulk was the great vizier of the Great Seljuk Empire and he founded several madarasas in the cities of Isfahan, Musul, Merv etc.

Nizamiye madrasas were also founded to serve the purpose of trained personnel for the state by Nizam'ul Mulk. Courses lectured in Baghdad Nizamiye Madrasa were divided into four main branches such as religion and law, language and literature, philosophy and positive sciences. These branches were also contained different subjects. These branches and their subjects were as follows:

<u>Religion and Law</u>	<u>Language & Literature</u>	<u>Philosophy</u>	<u>Positive Science</u>
Qur'an	Arabic literature	Philosophy	Medicine
Tafsir	Poetry	Logic	Surgery
Islamic Law	History		Arithmetic

Later philosophy was removed from the cirriculum. These madrasas taught religion, law and language. The language of education was Arabic, but in some places it was also used to Turkish. In here, education system was based on rote-learning. Professors of the madrasa were selected by sultan or vizier. In general, they were working until they died. It was a requirement that professors in Nizamiye Madrasa have to be Shafii communion, unlike madrasas in Karakhanids. However, there was no any prerequisite for the students. In Seljuk, students of madrasa were called *fakih*. In Nizamiye madrasa, education was free and it was found by etatism (state).

In general Madrasas were constructed single storey. Seljuk madrasas in Anatolia were divided into yard-type and domed. Madrasas consisted of yard, iwan, small mosque, shrine, student rooms, winter classroom, pool, fountain. Nizamiye madrasa was a model for the other madrasas founded in Ottoman.

OTTOMAN

In Ottoman, the madrasa system was inherited from the Seljuks and it was founded many madarasas during Ottoman. In Ottoman educational system was mainly based on Seljuk educational system, but ther was also some innovations. The new language called Ottoman Turkish emerged, this was an artificial language including Turkish, Arabic and Farsi. While in Anatolian Seljuk, Konya, Sivas and Kayseri were the science centers; in Ottoman, Bursa, Edirne and Istanbul were the science centers. (Izgi, 1997, p. 20).

In the Ottoman, all educational institutions except Enderun were called Madrasa. Enderun was a palace school for the Christians of the Ottoman Empire, which primarily recruited students via devshirme.Devshirme was a system of gathering of Christian children for serving the Ottoman government. Until Tanzimat period, there were only two formal educational instutions in Ottoman. These were Sibyan schools and madrasas. Sibyan schools were primary schools; education was free and compulsory in these schools.

The first madrasa called Orhaniye madrasa in Ottoman was founded in İznik by Orhan Bey in 1331. “Between the years 1331- 1451 a total of eighty-two madrasas were founded in Ottoman” (Ihsanoglu, 2004, p. 7). The teacher of madrasa was called muderris. The assistance of muderris was also called muid. Madrasas had three different levels: secondary school, high school, and university level. Madrasas included a library, dormitories, a mosque etc. There were three main branches wick taught in madrasas. The first was law and religion, the second was rational sciences such as philosphy and mathematics, and the third was instrumental sciences such as grammar, logic, rhetoric. In Ottoman there were also four main vocational and specialized madrasas. These were called Darulhadis, Daruttip, Darulmesnevi, and Darulkurra. In Darulhadis, it was taught hadits. In Darruttip, medical science was taught. Mevlana’s Mesnevi was read in Darulmesnevi. And in Darulkurra, it was trained hafiz.

From Seljuk to Fatih the basic aim of education was religion in madrasas. Until Fatih Sultan Mehmet the curriculum of Ottoman madrasas was based on the curriculum of Nizamiye Madrasas, madrasa education was systematized by him. Fatih converted many churches including Ayasophia into madrasa. He founded Tetimme and Sahn-ı Seman madrasas.. Sahn-ı Seman Madrasas contained eigth madrasas, Islamic sciences such as tafsir (commentary), hadith (sayings from Muhammed, the prophet), fiqh (Muslim canonial jurisprudence), and kalam (theology) were taught in these madrasas.

The students of Sahn-ı Seman were trained in Tetimme. There was a hierarchy among madrasas. The highest level of madrasas was Sahn-i Seman. The levels of the madrasas were associated with the daily salary of muderris. The hierarchy among madrasas as follows: Tecrid, Miftah, Kirkli, Hariç, Dahil and, Fatih madrasas. The most advanced examples of Ottoman madrasas were Fatih and Süleymaniye madrasas.

In Ottoman, there was no any end time of madrasas. The aim was to read some books. However, at least one or two years education was given. The number of students was not over twenty. Four days in a week there was a course. All courses in madrasas began after breakfast and continued until lunch time. There was no any class in religious holidays and holy nights. In holy months, students went to different villages to give some advaces to villagers. This was called “*cerre çıkmak*”. This was a kind of practical implementation of theoretical knowledges. Students graduating madrasa could be teacher (*muderris*), mufti, kadi, sect leader etc. A diploma called *icazetname* was given students. (Akyüz, 2011, pp.67-79).

Madrasas provides equal opportunities to all peoples. Education was free. Madrasas were designed like a boarding school. To provide accommodation service there were some dormitories called *hücre* and to provide nutritional requirement there were some cafeterias called *imaret*. These Hücre and Imaret were the characteristic features of madrasas. (Sarıkaya, 1997, pp. 34-35).

In Ottoman, in every level of madrasa students was called to different names: The students of sibyan school were called talebe, students of secondary school were called softa and students of higher school were called danismend. The general name of madrasa students was talebe-i ulum.

After 1776, Madrasa was more effective on civil schools rather than military schools. The end of the empire, madrasas began to loose their importance. The beginning of deterioration of madrasas dated Kanuni time. It began the illegal appointments of madrasa teachers. Later, demoralization of discipline, the effect of war, decrease in population, publications against madrasas caused the deterioration of madrasas. Therefore, interest to madrasas was decreased and the number of students were very few in madrasas. During this time, there was an instability of madrasas; while one was opened, another was closed because some madrasas were only opened for unemployed muderris. To recover madrasas from this undesired situation, it was taken some steps. Finally, to reform madrasas, an enactment was declared called “renovation of madrasas law”(*medreseleri ıslah nizamnamesi*) in 1914. However, corruptions in madrasas continued uncontrollably.

TURKISH REPUBLIC

After Ottoman Empire, Turkish Republic was founded in 1923 by Mustafa Kemal Atatürk. New educatinal system has emerged with new state. Latin alphabet was accepted an coeducation began.

In the new state, education has been secular and democratic. After the Establishment of Turkish Republic, a significant step was taken with the acceptance of the Law on Unification of Education (*Tevhid-i Tedrisat Law*) in 1924. With this law: All scientific and educational institutions were brought under the Ministry of National Education and madrasas were closed.

CONCLUSION

Madrasas were indications of the developing of science and education in Islam world especially in Ottoman. They were affected on the education of the world. At the beginning, madrasas accepted students by way of examinations, and curriculum was rich. However, positive sciences and philosophy were removed from curriculum and education was only concentrated on religious subjects. The language of education was Arabic, but in some places it was also used to Turkish. The method of education was based on rote-learning.

Madrasas were constructed like an Ottoman social complex (*külliye*), these referred to today's campus. They included a library, a mosque or prayer room, dormitories, yard etc. The teaching staff of madrasas consisted of teacher (*muderris*), assistance of teacher (*muid*), and student. In the beginning of the Ottomans, teachers were more important than madrasas. The importance of madrasas were determined according to the qualities and salaries of teachers. In madrasas, education was free and it was given scholarship for the students. Madrasas were financed by pious foundations.

Madrasas were an integral part of the Islam educational system. They had similar curriculum in all. In Ottoman, educational system was developed by the Seljuk Turks. The type of Nizamiye Madrasa was affected on the madrasas of the Ottoman. "The madrasa system inherited from the Seljuk Turk continued in existence augmented by the contributions of the Ottomans" (İhsanoğlu, 2004, p. 4)

Many students who came from different countries in Europe, studied in Muslim madrasas in Spain and Sicilia. These graduated students founded high schools called university in their countries such as Bologna, Oxford. So madrasas were not only in Islam world, they also had an important place in all of the world.

In sum, madrasas played an important role to shape the educational system in the history of Turkish education. Today's educational system has been affected educational system of madrasas. Especially, there was a close relation between Islam and madrasa. The place of madrasas was undeniable in spread of Islam. However, the deteriorations caused to disappearance of madrasas. Along with the new state, Turkish Republic, educational system has been renewed and become vital. Instead of madrasas, many schools and universities has been founded. In this way, a perception of contemporary, secular, progressive, multiple education has been arisen.

References

- Akgündüz, M. (2004). *Osmanlı Medreseleri XIX. Asır*, İstanbul: Beyan.
- Akyüz, Y. (2011). *Türk Eğitim Tarihi*, Ankara: Pegem
- Baltacı, C. (2005). *XV ve XVI. Yüzyıllarda Osmanlı Medreseleri*, İstanbul: MÜ İlahiyat Fakültesi
- Hareir, Idris El& M'Baye, R. (2011). *The Different Aspects of Islamic Culture*, vol. 3 "The Spread of Islam Throughout the World", France: UNESCO Publishing.
- İhsanoğlu, E. (1999). *Osmanlı Medeniyeti Tarihi*, cilt I, İstanbul: Feza Gazetecilik A.Ş.
- İhsanoğlu, E. (2004). *The Madrasas of the Ottoman Empire*, FSTC Limited.
- İzgi, C. (1997). *Osmanlı Medreselerinde İlim*, İstanbul: İz yayıncılık.
- Sakaoğlu, N. (2003). *Osmanlı'dan Günümüze Eğitim Tarihi*, İstanbul: İstanbul Bilgi Üniversitesi Yay.
- Salmi, Ralph H. & Durgun, Gonca B. (2005). *Turkish-U.S. Relations: Perspectives from Ankara*, USA: Brown Walker Press.
- Sarıkaya, Y. (1997). *Medreseler ve Modernleşme*, İstanbul: İz yayıncılık.
- Şanal, M. "Kuruluşundan Ortadan Kaldırılışlarına Kadar Olan Süre İçerisinde Medreseler" http://dhgm.meb.gov.tr/yayimlar/dergiler/Milli_Egitim_Dergisi/143/17.htm

The Place Of Tourism Education In Vocational Training

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ABSTRACT

Vocational training of the workforce in the tourism sector forms part of the tourism policy and planning. The importance of education and especially vocational training is increasing. It is bound to conscious, well-trained, competent and qualified staff who are able to share responsibilities to live an efficient and successful term for businesses.

Various research show that the need for trained skilled manpower in the tourism sector is important for each stage of the sector. Therefore, people at every stage of tourism education must be equipped with practical knowledge and skills. In the education due to the dynamics of sector, it must be a dynamic structure. In other words, one of the basic conditions to exist in an increasingly competitive environment is qualified manpower. This can only be achieved by effective and high-quality tourism education and training as well as working of graduates of tourism schools in the sector.

In the tourism sector, businesses and educational institutions should be in cooperation. Acting in partnership of vocational training decisions of the society and businesses that produces goods and services is an important step towards development and preserving of resources.

Keywords: Tourism, Tourism Education, Vocational Training.

INTRODUCTION

The rapid, continuous and multidimensional transformation process that the technological advancements have created in the economic, political and cultural structures of societies leaves profound effects on almost any country irrespective of the differences in their level of development.

Corresponding to the developments in science and technology there is a rising demand for qualified labor force. Driven from the notion that the best investment is the investment to human capital, the prioritized importance attached to human capital and quality to ensure the creation of a knowledge-based society constitutes the foundation of development itself. The most effective forms of human capital is vocational training and teaching which bears vital role in raising a society closely linked to employment and economy and also influential in the development and creation of present and future society. Raising competent and knowledgeable labor force adequately skilled to meet the needs of modern labor market and apply modern technologies contributes significantly to the development of national economy and ensuring social adaptation. The enhancement in the production capacity of any country's national economy, and the rise in the employability and competitive power in free international market and the climb in social welfare level are all correlated to the knowledge and skill level of the labor force or in other terms it all depends on the vocational training and teaching of individuals possessing advanced qualities and quantities.

Major tasks and duties are allotted to vocational training system to the end of raising talented labor force as one of the fundamental tools of economic and technological development.

In order to meet the need for skilled and technical labor force that emerged as a consequence of the changes witnessed in the world of science, technology and business several types of vocational training programs have been formed for different organizations and different stages of education. Vocational training as a reflection of its scope bears a dynamic character. Vocational training is a three-dimensional unity composed of reciprocally interacting bodies: business, human and training.

Vocational training is an educational process geared towards instilling the kind of knowledge, skills and business practices that will be needed in business life and refining individual talents.

Via Vocational Training;

- People can gain professional competency.
- People can gain higher quality.
- Present qualities of the labor force can be improved.
- The efficiency and quality in business life can be elevated.

In line with these statements it is feasible to take into account market-compliant joint customer programs while focusing on vocational training.

The training should be oriented towards production rather than consumption. Otherwise it is likely that the money spent for education will end up as a waste.

TOURISM EDUCATION WITHIN THE SCOPE OF VOCATIONAL TRAINING

Qualified labor force provided via vocational training bears importance in the development of countries and creation of better quality goods or services.

Lack of qualified labor force is a crucial problem for tourism industry as is the case for all the remaining sectors. One of the vital steps in the planning of tourism policies is identifying the demand for staff and forming the essential teaching-training system to meet such demand. International studies related to this subject put forth that 'vocational training' is the most challenging issue. The findings of researches conducted by World Tourism Organization (OMT) in different countries underline that tourism industry is in increasing need of vocational training and formation of administrative cadre. Particularly noticeable are developing countries in which the low level of vocational and technical knowledge and down quality of tourism services dissuades tour operators to organize trips to such countries. Entering into the tourism market in which there is ever-rising competition with a certain level of standard and quality service relies on creating a particular level of social awareness as well as training skilled and adequate numbers of personnel. The countries having internalized this necessity have been frequently applying 'on the job training' which relates to learning by doing principle of vocational training. It is even considered that such form of training should not be restricted with tourism education alone but be prioritized in the formation of the main policy of national education system and educational practices.

Tourism industry is a sector that can speed up financial and social development process, stabilize interregional imbalances, create larger domains of employment particularly by encouraging the participation of women and youngsters and keep the social peace alive while boosting social welfare.

In international market tourism is the battle for quality between goods and services. Quality calls for an adequate level of tourism awareness within society and demand for sufficient quantities of educated personnel within the industry. Since the employees in tourism industry are remarkably influential in the quality of national tourism training and education is, compared to other industries, a much more significant issue in tourism.

On the other hand the other components of tourism industry such as hotels –restaurants, travel agents, transportation vehicles, entertainment venues, and museum are the physical structures. What makes these structures meaningful is human force that can offer the service meeting the level expected by modern tourists.

Tourism industry agents in Turkey are particularly complainant about the problem they encounter in recruiting adequate number of qualified personnel. There are frequently witnessed negative incidents due to the poor foreign language skills of tourism personnel and defects in appropriate behaviors and technical knowledge background.

Entering into the tourism market in which there is ever-rising competition with a certain level of standard and quality service relies on creating a particular level of social awareness as well as training skilled and adequate ratios of personnel. It is on the other hand feasible to train the qualified personnel only via a high-quality tourism education.

TOURISM EDUCATION IN TURKEY

Tourism education is a vocational training conducted to raise the kind of tourism labor force capable of applying research and planning activities; that can fuel the efficiency of corporations and catch up with the new practices in the business sector.

When the issue is related to personal education, vocational training specifically, the required knowledge and skills for this sector are offered in the related educational institutions. In Turkey the earliest date of tourism education goes back to year 1961-1962 in Ankara. The earliest tourism education institutes formerly named as 'School of Lodging' spread in 1975 as 'Hotel Management and Tourism Vocational High Schools'. Currently these schools are termed as Vocational and Technical Anatolian High Schools affiliated to the General Directorate of Vocational and Technical Training.

In higher education level the first programs in tourism are dated to year 1965 with the establishment of Ankara Commerce and Tourism Higher Teacher Education School which also entailed a tourism department within its

organization. The school was incorporated into Gazi University in 1982 and continued to offer education as Faculty of Vocational training - Commerce and Tourism Education department. In 1992, the department operated as Gazi University Faculty of Commerce and Tourism Education. In the subsequent years different programs on tourism were opened in a variety of universities; departments providing tourism education in associate and graduate degrees were set up and these departments multiplied in different names and graduated higher numbers of students in due course.

In Turkey two distinctive forms of tourism are offered currently within the scope of general tourism: formal and non-formal tourism education.

A. Formal Tourism Education: School education geared towards receiving a diploma.

It is feasible to claim that the key objectives of formal tourism education within the scope of vocational training are to provide basic training to the prospective employees in tourism industry, to instill tourism awareness and philosophy to the trainees, to teach management techniques and foster the compliance with worldly-recognized approach and to train senior tourism administrators who can grasp new concepts, insights and technologies.

Educational institutions providing formal tourism education consist of vocational tourism schools offering education in Secondary Education and Higher Education level. Till year 2014, Vocational Tourism Education in Secondary Education level was offered in,

- Girls' Technical and Vocational High Schools
- Predominantly in Vocational Schools of Tourism and Hotel Management

Nonetheless within the context of restructuring of vocational and technical secondary education system led by the Ministry of National Education (MEB), the schools previously titled in Turkey as industrial vocational high schools, vocational high schools of tourism and hotel management, trade vocational high schools, girls' technical and vocational high schools and medical vocational high schools were grouped under one single name: Vocational and Technical Anatolian High School. The qualified labor force demanded in the sector is trained in these schools. In particular, Vocational and Technical Anatolian High School of tourism are the training and teaching institutions educating qualified labor force for the reception, service and kitchen offices in the hotels, restaurants and miscellaneous lodging facilities. The applied training programs in these institutions are at basic vocational training level. The objective is to gain the students basic vocational skills in the specific programs they attend.

Institutions offering formal tourism education in higher education level are;

- Vocational Colleges
 - . 2-year diploma program in Tourism and Hotel Management (associate degree)
- Undergraduate Colleges
 - . 4-year Tourism Faculties
- Universities offering post graduate education
 - . Masters and PhD programs.

Among tourism educations offered in different levels of higher education institutions are associate degree programs affiliated to vocational colleges. Associate degree programs cover a 2-year period. In Vocational Colleges tourism education is executed in tourism and hotel management programs. The objective in these programs is, by enabling the students to combine knowledge and experience, to acquire the qualities required from intermediate staff in the sector.

Undergraduate education in higher education level is extended to 4 years and the main objective in this education is to train junior administrators in tourism industry. In Turkey tourism education in undergraduate level is offered in faculties of tourism.

The main objective in postgraduate tourism education is to train the administrators and researchers capable of solving complex social, financial and technical problems of modern tourism and possessing the skills of abstraction, synthesis and judging by analyzing the efficiency of various factors.

B. Non-Formal Tourism Education:

Teaching and training activities that are executed by a range of establishments offering certificates for the attendees are within the scope of non-formal tourism education. These are short-term vocational courses given by state as well as private institutions. The population benefiting from non-formal vocational training services is basically the newly employed youngsters or juveniles having missed the opportunity of continuing secondary education or adults aspiring to learn a profession. Additionally individuals having already registered as students

to a formal educational institution but willing to develop themselves in the direction of personal interests are also eligible to attend non-formal vocational training bodies. As we analyze the general objective of this form of tourism education it surfaces that the main motives are infusing tourism awareness into the individuals, developing affection and tolerance by preserving the creative sources of tourism, providing the moral and ethical training on the equal and fair service to tourists and forming a behavior style founded on the pillars of genuine love and hospitality.

In Turkey the corporations and institutions offering non-formal tourism education are;

- Ministry of Culture and Tourism,
- Ministry of National Education,
- Ministry of Labor and Social Security,
- Professional Organizations
- Faculty of Open University,
- Social corporations,
- Universities,
- Municipalities,
- Unions,
- Private education centers,
- Establishments

To sum up, both formal and non-formal vocational trainings are responsible with training junior labor force who can provide a number of services demanded by tourism managements and also raising mid-level labor force that can be defined as intermediary staff and senior labor force that can be employed as administrators, researchers and planners in the state and private corporations related to tourism industry.

Nonetheless there are certain deficiencies and faults in the vocational tourism education offered in Turkey. There is a widespread perception that something is wrong in raising the sufficient quality and quantity of personnel for tourism industry and that existing tourism education institutions fall short in meeting the prevalent demand. The failure of current education system to prioritize the wills of business life and meet the demands of work life in the expected speed and variety are the most significant factors pulling the effectiveness of education down.

To the aim of correcting the problems listed hereinabove tourism businesses and educational institutions in tourism are required to stand united. Businesses are the users of staff who receive the vocational training provided to the market. To put this differently labor market holds the position of claimer of educated personnel. The demand for individuals having received vocational training can surface only with the employment of such staff. The correlation between the negative –positive factors in employment and overall efficiency is crystal clear in the eyes of employers. Thus in order to transform labor force having received vocational training into qualified and efficient staff further emphasis should be rendered to demanded branches in education upon gathering the views and suggestions of business world. In that case the united co-action of vocational training bodies in society and businesses manufacturing goods and services would stand as a major step in terms of development as well as saving of resources.

CONCLUSION

In order to ensure the development of tourism industry the phenomenon of a deep-rooted tourism education and problem of educated personnel gain increasing importance each day. So as to attain the envisaged objectives particular care should be paid to employ qualified personnel in touristic establishments, raising the social awareness on tourism and recognizing the fact that this education is equally important as the investment to tourism. The success and efficiency of Turkish tourism which has recently entered into a stage of advancement is only possible with the joint efforts of all institutions offering tourism service.

The main objectives of vocational tourism education are; enhancing the efficiency in tourism sector which, as a service-based industry, relies heavily upon skilled labor force; refining the humanitarian aspects of staff providing direct service to clients; setting a balance between authority-competency and responsibility of the personnel; gaining the kind of skills enabling the personnel to solve encountered problems and control the outcomes. Such education can attain its objective only with the cooperation of relevant institutions.

While the service quality and efficiency of the personnel employed in tourism industry play primary role it should be kept in mind that it is a must to provide a responsible teaching and training system that can rise above the quality of tourism labor force.

References

- Aksu, M., Burak, T. (2012). Mesleki Turizm Eğitimi. *Aksaray Üniversitesi, İktisadi ve İdari Bilimler Fakültesi Dergisi*, 4(2), Aksaray
- Alkan, C., Doğan, H., Sezgin, İ. (2001). Mesleki ve Teknik Eğitimin Esasları. Ankara: Nobel Yayınları
- Arslan, E., Boylu, Y. (2014). Türkiye’deki Turizm Eğitiminde Son Rakamsal Gelişmeler, *14. Ulusal Turizm Kongresi*, 5-8 Aralık 2013, *Turizmde Yenilik*, Kayseri
- Aydın, S. (2002). Turizm ve Eğitim. *Turizm eğitimi konferans – workshop*, 11-13 Aralık 2002, Ankara
- Gök, İ., Şimşek, M. (2005). Mesleki ve Teknik Öğretime Genel Bakış. *AB Kopenhag Maastricht Bildirgesi Açısından Türkiye’de Mesleki Öğretim ve Eğitimi Bekleyen Zorluklar Uluslararası Konferansı*, 7-8 Haziran 2005, Ankara.
- Gümüş, İ. (2005). Türkiye’de Hizmet Ağırlıklı Önlisans Eğitiminin Niteliği ve Özel Sektörün Beklentileri. *AB Kopenhag Maastricht Bildirgesi Açısından Türkiye’de Mesleki Öğretim ve Eğitimi Bekleyen Zorluklar Uluslararası Konferansı*, 7-8 Haziran 2005, Ankara
- Hacıoğlu, N. (1992). Yükseköğretimde Mesleki Turizm Eğitimi Geliştirme Perspektifleri. *Turizm Eğitimi Konferans-Workshop*, 9-11 Aralık 1992, Ankara
- Hacıoğlu, N., Kaşlı, M., Şahin, S., Tetik, N. (2008). Türkiye’de Turizm Eğitimi. Ankara: Detay Yayıncılık
- Kulahçı, M. (1991). Turizm Sektöründe İşgücünün Mesleki Eğitimi. *Turizm Eğitimi Konferans –Workshop*, 9-11 Aralık 1992, Ankara
- Olalı, H. (1984). Türkiye’de Turizm Eğitiminin Yapısı ve Sorunları. *Turizm Eğitimi Kongresi, Tebliğ ve Tartışmalar*, Boğaziçi Üniversitesi, Meslek Yüksekokulu Turizm İşletmeciliği Programı, 16-17, İstanbul
- Sevgi, A. (1992). Turizm Eğitimi. *Turizm Eğitimi Konferans – Workshop*, 9-11 Aralık 1992, Ankara
- Ulukan, E. (1998). Türkiye’de Uygulanan Meslek Eğitimi Modellerinin Karşılaştırmalı Değerlendirilmesi. Ankara: TES-AR Yayınları
- Turan, K. (1996). Ahilikten Günümüze Mesleki ve Teknik Eğitimin Tarihi Gelişimi. *M.Ü İlahiyat Fakültesi Vakfı Yayınları*: 129, İstanbul
- TÜSİAD. (1999). *Türkiye’de Mesleki ve Teknik Eğitimin Yeniden Yapılandırılması*, Yayın No: TÜSİAD-T/99-2/252, İstanbul
- Yıldız, S.B. (2013). Lisans Düzeyinde Turizm Eğitimi Alan Öğrencilerin Sektörde Çalışmaya Yönelik Bakış Açıları. *14. Ulusal Turizm Kongresi Bildiriler Kitabı, Turizmde Yenilik*, Kayseri: Detay Yayıncılık
- Yörük, S., Dikici, A., Uysal, A. (2002). Bilgi Toplumu ve Türkiye’deki Mesleki Eğitim. *Fırat Üniversitesi, Sosyal Bilimler Dergisi* 1(2): 299-312, Elazığ.

The Possibilities Of Development Of Planar And Spatial Orientation In High School Students

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ABSTRACT

Technological and polytechnic education in the field of computer aided design (drafting) in 2D and 3D at non-technical secondary schools represents a new and relatively unexplored area. It is therefore necessary to deal with questions concerning the necessity of such training, and its potential influence and/or impact on students' further development. The answers were sought via an investigative research, the outcomes of which are presented by the submitted paper.

Keywords: Planar and spatial orientation, high school students, technological and polytechnic education

INTRODUCTION

Technology is an internal part of our life, it is all around us. Nowadays, a person without necessary basic technical knowledge and skills would not be able to perform their social function properly, and, consequently, would not live a full life (Zubata, Plishke & Kropáč, 2011). Therefore, elementary technical knowledge and skills should be mediated to the general public, not just to the students of technical secondary schools, by the educational system. In terms of advanced educational systems, elementary technology training represents an integral part of the general curriculum taught at elementary and secondary schools. It is transferred to pupils and students via a school subject, different not only in name (practical training, practical activities, technical training, technical practice, technique, practice, technology etc.), but also in scope and content.

Over the recent years, the term "subjects of technical character" has been used in professional literature (Idrus, Mond & Abdullah, 2010). By means of this subject, pupils acquire not only theoretical knowledge, but also elementary work skills. The emphasis is usually placed on technical creativity, depending on students' fields of interest, and the training is carried out mostly within the framework of optional subjects. Despite the rapid development of computer technology in all developed countries' education systems, elementary manual activities of technical nature such as woodworking, metalworking, working with tools and simple machines, electrical work etc.), remain a part of the curriculum. A combination of the two aforementioned is more and more common. The aim of the technology or polytechnic education is to develop the skills of the learners in manipulating working tools and machines, adopting work culture, and to acquaint them with the scientific principles of contemporary production, safety rules, etc. (Mojžíšek, 1981).

At present, these objectives are further developed by the supportive role of ICT, as information technology today covers or supports a significant part of industrial production. The aforementioned goals shall be well achieved in technically oriented subjects, which are based on the combination of the two stated goal segments, and the content and process side of which are close to a number of professions, not only these called technical today (Manullang & Kons, 2012).

Even though teaching at primary and secondary schools is primarily focused on general training, preparation for the use of computer technology and technology in general grows in importance as a component of education (Granath, 2003, p. 129). These efforts have not only been declared, but also embedded in a wide range of curricular and policy documents, and in many cases they have also been financially supported by various grants. The above stated facts indicate that education systems clearly aim to promote polytechnic education. Unfortunately, at least in terms of the Czech education system, it is not always the case. During 2006 and 2007, the Faculty of Informatics and Statistics of the University of Economics in Prague in cooperation with the company CACIO-CSSI-SPIS conducted a complex research to analyze students' of grammar schools readiness for academic studies at technical universities.

The study involved 53 faculties all over the country. The conclusions of the study were alarming, as they revealed a lack of experts in technical fields, as well as the absence of expertise among teaching staff, and an inadequate level of education at grammar schools in technical disciplines, based on the rudiments of drawing documentation, as one of the most important prerequisites for successful studies at technical universities.

Moreover, according to the conducted study, only a small percentage of grammar schools' students proceed with their studies at technical universities. They prefer fields of study more related to humanities, though their dispositions to study at technical universities might be very good (mathematics, chemistry, physics, etc.). Following the results of the aforementioned study, the author of this paper conducted a similar research in 2013 (Klement, Kubrický, 2013), a part of which was carried out at six 8 and 6 year grammar schools. Among others, a question concerning the reason why so few students of these grammar schools apply for technically oriented universities was asked. The most frequent answer received from the students was a claim that they were unable to assess the benefits of technology studies, because their high school's curriculum did not involve any subject which would at least partially expound technology and technical issues to them.

Based on these results, we started to prepare in 2013 and implemented in 2014 an experiment, based on the inclusion to the set of ICT subjects taught at 8 and 6 year grammar schools of a thematic unit "Application of mathematics and chemistry in computer-aided technical drawing", which integrated both the technical area of technical drawing and drawing documentation, and the area of specialized CAD software tools used in these activities (Klement, 2001). The experiment thus consisted in the introduction of a new thematic unit to the established curriculum, and in the evaluation of the impact of thus conceived education on the students.

SPATIAL IMAGINATION AND ITS DEVELOPMENT

Despite the fact that most of us do not even realize it, spatial imagination accompanies us throughout our lives and at every step. Spatial orientation begins to develop as early as in infancy, when the child learns to follow the trajectory of moving objects and focus on the immediate area. The development starts in the vertical direction when a child, thanks to the Earth's gravity, adopts the notions of up and down. Anteroposterior and horizontal movements follow, improving and deepening of the perception then go on throughout the rest of our lives. We cannot classify imagination as a purely mathematical, or psychological ability, however, there are fields of human activity which require a developed spatial imagination, for example sculpture, topology, architecture, building construction, and other technical disciplines.

According to Jirotkova (1990), spatial imagination equals intellectual ability to purposefully recall:

- earlier seen or perceived objects in three-dimensional space and recall their properties, location, and spatial relationships
- sooner or at any given moment seen or perceived objects in a different relative position than they were at, or are actually perceived
- object in space based on its planar visualization
- non-existent real object in three dimensional space on the basis of its verbal description

Spatial imagination develops along with the development of certain skills, such as the ability to

- communicate (especially graphic communication)
- use tools and features,
- work with mathematical and technical terms,
- apply mathematical and technical knowledge,
- explore and work creatively.

Spatial imagination can serve various purposes. It can be a useful tool, an auxiliary way of thinking, a method to obtain information or to formulate a task, and/or a means to solve a particular problem. Thanks to the versatility and the use of spatial imagination, there are many different definitions of the collocation. Obviously, the definition by a psychologist will differ from the one by a neurologist, a teacher, or an engineer. Apparently the broadest definition of the term has been provided by a pedagogical sciences professor H. Gardner (1999): *"The core of spatial imagination are the capabilities which ensure an accurate perception of the visual world, facilitate the transformation and modification of the original perceptions, and create a visual experience from one's own mental images, even in the absence of outward stimuli effect."*

The aforementioned functions of spatial imagination are used in mathematics in order to solve various tasks, in chemistry for visualizing chemical bonds, in technical drawing, and while designing solids, shapes, and objects. That is why lessons of technical drawing or computer-aided technical drawing create favorable conditions for the development of spatial imagination and technical thinking (Kropáč, 2004). To be able to compile, and to project appropriate teaching of 2D and 3D drawing documentation based on the use of up-to-date electronic study materials, it is necessary to continuously determine their impact on the target group, and regularly identify the views and the attitudes of the later. Based on the conducted investigation, it is possible to correct some of the negative side effects or, on the other hand, accentuate the positive effects. Teaching computer-aided technical drawing, supported by well selected teaching materials thus offers many a possibility for more effective teaching

and developing interdisciplinary links (Grecmanová, 2000).

SETTING CONDITIONS FOR THE IMPLEMENTATION OF THE EXPERIMENT

A necessary precondition for the implementation of the experiment was to create its own concept and content of education, focused on the use of CAD systems, for the purpose of the enrichment of teaching of mathematics and chemistry at 8 or 6 year grammar schools with the practical application based on the use of computer-aided technical drawing. A new training module "*Application of mathematics and chemistry in technical drawing*" was developed, the aim of which was to elaborate interdisciplinary links, interconnect theory and practice via real life examples and practical tasks (Grecmanova, 2000), and last but not least contribute to a substantial development of the competencies of the students in the field of computer-aided technical drawing (Klement, 2003), as one of the important factors facilitating their potential further studies at technically oriented universities.

The aforementioned module enabled a substantial development of interdisciplinary links between math and chemistry, as a consequence of practical use of the students' knowledge of the two subjects during the visualization of objects in 2D and 3D space, elaborated to technical drawing, as one of the basic means of graphic communication. The practical application related mainly to the following fields:

- Plane geometry (parallels, skew lines, etc.).
- Spatial geometry (spatial solids and surfaces, conics, etc.).
- Boolean algebra (operators and, or, or and their graphic visualization).
- Descriptive geometry (traces of planes, intersections between planes, solid edges).
- Visualization of the atomic structure of matter (visualization of the core structure and valence spheres).
- Modelling of element molecules (visualization of molecular structures).
- Modelling of compound molecules (visualization of the molecular bonds).

To be able to implement the aforementioned experiment, a joint project of the Department of Technical Education and Information Technology of the Faculty of Education of Palacký University Olomouc and 6 partner 8 and 6 year grammar schools from Olomouc region called *CAD - computer-aided technical drawing at schools*, was carried out. The project was aimed at an extension of the subject matter of math and chemistry lessons by practical application of computer-aided technical drawing in the second or third year of a four-year program of study 79-41-K/41, or equivalent years in a six-year program of study 79-41-K/61, and/or eight-year program of study 79-41-K/81 of grammar schools. It was based on an active approach of teachers (methodologists) to the development and implementation of a new learning content and application of subjects, creation of a new learning program, including its verification in live instruction. Moreover, the individual key activities comprised all the basic processes associated with the change in the content of particular subjects' curricula, focused on practical application and use of computer-aided technical drawing in lessons of mathematics and chemistry.

Due to the activity character of the realized teaching, which took account of the needs of 6 and 8 year grammar schools, a practical application of knowledge on concrete examples was used as a method, including the creation of 2D and 3D visualizations which enabled the students to better understand the subject matter (Klement, 2013). Thus conceived concept guaranteed that the students would be able to practically apply their knowledge to real-world examples. It should be noted that the structure of the particular units was mostly focused on mastering the knowledge and the skills immediately required for basic orientation in the field of creating 2D and 3D drawing documentation in AutoCAD 2013 system (Klement 2013b). For the contents of particular training modules see below:

Name of the training module	Content of the training module
Training module 01: Applications of mathematics: Introduction to plane geometry	The module familiarizes students with the basics of the operation and the use of the AutoCAD 2013 user interface. Via practical examples, students are gradually informed about various parts of the interface and functions of AutoCAD 2013, and also get acquainted with the creation of basic plane geometric figures.
Training module 02: Applications of mathematics: Creation and basic alteration of geometric figures	The module familiarizes students with further possibilities of the operation and the use of the AutoCAD 2013 user interface. Via practical examples, students are gradually informed about further parts and functions of AutoCAD 2013 interface, and also get acquainted with the creation of further plane geometric figures.
Training module 03: Applications of mathematics: Creation and more advanced alteration of geometric figures	The module builds on knowledge gained in previous teaching modules 01 and 02 and extends them by introducing possible alterations of plane geometric figures via advanced modifications. Students are gradually initiated to the practical application of these modification options, both via frontal teaching and practical examples requiring individual work.
Training module 04: Applications of mathematics: Creation and advanced alteration of plane figures	The module builds on knowledge gained in previous learning modules 01, 02 and 03, and extends them by introducing possible alterations of plane geometric figures via advanced modifications. Students are gradually initiated to the practical application of these modification options, both via frontal teaching and practical examples requiring individual work.
Training module 05: Denoting dimensions of plane figures	The module is focused on denoting the dimensions of plane figures. Students are gradually acquainted with the basic principles and approaches regarding dimensioning of plane figures. They apply this knowledge in practice by creating both diameter and radius dimensions. They thus follow up to the issue taught in mathematics lessons and apply it in an AutoCAD 2013.
Training module 06: Applications of mathematics: Filling in plane figures	The module is focused on filling in, or hatching, plane geometric figures. Students are gradually acquainted with the basic principles of and approaches to hatching plane figures. They apply the knowledge in practice by creating hatched areas, both by selecting interior points and border areas.
Training module 07: Applications of mathematics: Basics of spatial geometry	Training module 07 is intended to introduce students to the basics of spatial geometry and spatial modeling in the AutoCAD 2013 system. By means of both frontal teaching and individual work, basic spatial elements and some selected surfaces are created by the students. They thus apply the knowledge of mathematics, which they extend with practical activities focused on the modeling of 3D spatial scenes and figures.
Training module 08: Applications of mathematics: Visualization of compounds and elements in space	The module follows up with the training module 07 and extends it toward practical applications of the knowledge of chemistry, especially the knowledge focused on the visualization of chemical elements and compounds. Students individually create 3D models of elements' and compounds' atoms and molecules in 3D space, using the AutoCAD 2013 system.
Training module 09: Applications of mathematics: Boolean operations in space	The module is focused on the practical application of Boolean operations on solids and surfaces in 3D space. On practical examples, students will be acquainted with the union, difference, and intersection operations. They will thus follow up with the subject matter of mathematics lessons, more specifically to Boolean algebra, which shall be practically applied in the system of AutoCAD 2013.
Training module 10: Applications of mathematics: Rotation and projection in space	The module focuses on the practical application of operations focused on the creation of spatial objects and surfaces in 3D space. Students shall be acquainted with the use of rotation and projection in practice. They will thus follow up with the subject matter taught in mathematics lessons, more specifically with the issue of transformation in 3D space, which they shall apply in practice in the AutoCAD 2013 system.

Table 1: The contents of the thematic unit "*Application of mathematics and chemistry in computer-aided technical drawing*"

Overall, the thematic unit "Application of mathematics and chemistry in computer-aided technical drawing" was divided into 10 separate training modules, following each other. The time allocation of individual training

modules was two lessons. The training modules were introduced into the curriculum and taught in the year 2014 at six 8 or 6 year grammar schools, they were attended by a total of 301 students, and 12 teachers were involved. Upon completion of this conceived training, it was possible to evaluate the impact and the results of the experimental subject matter from the perspective of students and teachers. The following text describes the procedure and the method of the evaluation of the results and of the impact from the students' point of view.

DESCRIPTION OF THE CONDITIONS, THE SAMPLE, AND THE METHOD OF EVALUATING THE RESULTS OF THE EXPERIMENT

The actual teaching of the thematic unit "Application of mathematics and chemistry in computer-aided computer drawing" was followed by a research investigation conducted at all involved schools. The investigation was aimed at a determination of opinions and attitudes of the stated schools' students on the instruction realized, and on its real impact on the educational process at these schools. A total of 301 students of the students who had experienced the lessons enriched by the experimental learning content participated in the research.

As the principal tool for obtaining the data necessary for the implementation of the research investigation, a questionnaire was used. Within the framework of research methods classification structure, questionnaire belongs to indirect methods of investigation. According to N. Ničkovič, a questionnaire can be characterized as "a specific measuring device by means of which opinions of individuals on particular phenomena are explored" (Horak & Chráska, 1983, p. 94-96). From the point of view of the person or respondent questioned, these phenomena can refer either to external phenomena, or to internal processes. That is why a structured evaluation questionnaire meeting the requirements of the research investigation was created (GAVORA, 2000). It stemmed from personal experience and enabled us to find about the students' views on and attitudes to the teaching of the thematic unit "Application of mathematics and chemistry in computer aided technical drawing."

Students were asked to fill out the questionnaire anonymously and thus present their views on and attitudes to particular questionnaire questions. They were asked to express their opinion by ticking the YES or NO option in compliance with their personal preference. For the description of the research sample, see Table number 2 below.

Gender	Number of respondents	Number of respondents in %
Boys	122	40.5 %
Girls	179	59.5 %
Total	301	100 %

Table 2: Structure of the research sample

As the main method for the evaluation of the acquired research data we used the chi-square test (Chráska, 1988), which enabled a determination of the dependency of the research outcomes on a significant sign of a group of respondents, that is to say on gender. In order to determine the potency of the particular groups of respondents, whose answers were the same, basic descriptive statistics and their visualization via tables were used. For the purpose of calculating, the statistical system Statistica 11 (Klímek, Stříž & Kasal, 2009) was applied. The following text presents some of the partial results of the realized survey, the aim of which was to find about the opinions and attitudes of students of 6 and 8 year grammar schools on and to the teaching of the topic "Application of mathematics and chemistry in computer- aided technical drawing" and its real impact on the educational process at these schools.

PARTIAL OUTCOMES OF THE CONDUCTED RESEARCH INVESTIGATION

In further text, we are presenting the outcomes of the conducted research, organized in six separate areas. Each analysis included the calculation of the pivot table, the calculation of the percentage, and the estimation of the particular outcomes' dependency on the sex of respondents. For the purpose of simplicity and clarity, all three analyzes are comprised in one table.

The first area examined was the level of interest in AutoCAD applications shown by the students. By answering the relevant question, students expressed their opinion on whether teaching supported by AutoCAD 2013 application was interesting for them and whether producing 2D and 3D drawing documentation was to any benefit. A summary of the outcomes based on their responses is illustrated by the Table 3 below.

Contingency table for: n = 301 Pearson's chi square: p = 0,048454 Was computer aided technical drawing interesting for you?			
Gender of respondents	Boys	Girls	Row totals
No, it was not – frequency	25	55	80 (27 %)
Yes, it was - frequency	97	124	221 (73 %)
All groups - frequency	122	179	301 (100 %)

Table 3: Interest in computer-aided computer drawing teaching

According to the findings presented in Table 3, it is possible to state that teaching of AutoCAD 2013 applications caught the interest of almost three quarters of students (73%) of 6 and 8 year grammar schools. The initial presumption that the inclusion of this experimental educational content would be regarded as interesting and beneficial by the students was hereby confirmed.

Furthermore, it is possible to conclude that there is a statistically significant difference ($p = 0.048454$) between the frequency of responses given by girls and boys. The boys' interest in AutoCAD applications 2013 proved significantly stronger than that of the girls, which, given the fact that technically oriented activities have always been more popular with boys, is not a surprising result and does not defy the average.

Next area of research was focused on whether the students consider teaching of AutoCAD 2013 applications as difficult, or more difficult than other activities aimed at the use of ICT. By answering the relevant questions, students expressed their opinion on whether the learning content of this thematic unit was more difficult for them to understand than the learning content of the other subjects focused on ICT, mathematics and/or chemistry. A summary of the outcomes based on their responses is illustrated by the Table 4 below.

Contingency table for: n = 301 Pearson's chi square: p = 0,070579 Did you find the lessons of computer-aided drawing difficult?			
Gender of respondents	Boys	Girls	Row totals
No, I did not- frequency	96	124	220 (73 %)
Yes, I did - frequency	26	55	81 (27 %)
All groups - frequency	122	179	301 (100 %)

Table 4: The level of difficulty of teaching AutoCAD 2013 applications

Based on the findings presented in Table 4, it is more than obvious that the vast majority of students of 6 and 8 year grammar schools do not consider teaching of AutoCAD 2013 applications as difficult, or more difficult than other thematic units focused on ICT, mathematics, and/or chemistry. This result indicates and confirms, among other things, that the general popularity of the subjects focused on sciences is low and that students therefore welcome every opportunity to enrich the lessons.

Furthermore, it is possible to conclude that there is a statistically significant difference ($p = 0.070579$) between the frequency of responses given by girls and boys. This time it was the girls who, in comparison to boys, showed a statistically significant enthusiasm for the inclusion of the experimental learning content into teaching, because they regarded it as less difficult.

The third area investigated was focused on the question whether the students would welcome the opportunity to further educate themselves in the field of 2D and 3D drawing documentation using AutoCAD system in 2013, both controlled and independent. By answering the relevant questions, students expressed their opinion on whether they found these issues as engaging and evolving as to be dealt with further on in the future. A summary of the outcomes based on their responses is illustrated by the Table 5 below.

Contingency table for: n = 301 Pearson's chi square: p = 0,002095 Would you like to educate yourself further in the field of computer-aided drawing?			
Gender of respondents	Boys	Girls	Row totals
No, I would not - frequency	70	133	203 (67 %)
Yes, I would - frequency	52	46	98 (33 %)
All groups - frequency	122	179	301 (100 %)

Table 5: Level of interest in further education in creating drawing documentation supported by the use of AutoCAD system

According to the findings presented in Table 5, it is more than obvious that only less than one third of the students, more specifically 33%, would like to be further educated in the field of the creation of 2D and 3D drawings using AutoCAD 2013 system. Although this result is inconsistent with the first stated analysis relating to the interest in this teaching, it can be explained by the fact that the general level of intentionality in education is currently lower and further education is thus refused by the students.

Furthermore, it is possible to conclude that there is a statistically significant difference ($p = 0.002095$) between the frequency of responses given by girls and boys, as the girls rejected further education in the field of AutoCAD 2013 applications more often than boys. Even this result is by no means unusual, and can be attributed to the generally lower popularity of technically and biologically oriented subjects among girls.

Yet another area of research was focused on the question whether the students actually apply the knowledge and skills gained in AutoCAD lessons in further education. The assumption was that especially those students who would consider further education in technical fields might show a preference for this need. On the basis of this analysis we can suppose those students might be interested in further technical education. A summary of the outcomes based on their responses is illustrated by the Table 6 below.

Contingency table for: n = 301 Pearson's chi square: p = 0,002431 Do you think you will use computer-aided drawing in further education?			
Gender of respondents	Boys	Girls	Row totals
No, I will not – frequency	68	130	198 (66 %)
Yes, I will – frequency	54	49	103 (34 %)
All groups - frequency	122	179	301 (100 %)

Table 6: The use of the outputs of AutoCAD 2013 applications teaching in further education

Based on the findings presented in Table 6, it is obvious that the vast majority of students do understand the necessity of teaching AutoCAD 2013 applications for creating 2D and 3D drawing documentation, because 34% of them claimed that the subject matter would be necessary for their further education. It is therefore possible to deduce that the level of interest in technical fields, where the use of CAD systems is more than common, is relatively high.

Furthermore, it is possible to conclude that there is a statistically significant difference ($p = 0.002431$) between the frequency of responses given by girls and boys, as the boys perceived the use of CAD systems for further education as more important than girls, which again is a result that could have been expected.

The fifth area of research was focused on the question whether the students actually apply the knowledge and skills gained in lessons focused on the creation of 2D and 3D drawing documentation in everyday life. Once again, the question is related, though indirectly, to the prospective professional orientation of the students and to their interest in the further career in technical fields. A summary of the outcomes based on their responses is illustrated by the Table 7 below.

Contingency table for: n = 301 Pearson's chi square: p = 0,000381 Do you consider computer-aided drawing beneficial from future perspective?			
Gender of respondents	Boys	Girls	Row totals
No, I do not - frequency	56	119	175 (58 %)
Yes, I do - frequency	66	60	126 (42 %)
All groups - frequency	122	179	301 (100 %)

Table 7: Benefit of the AutoCAD 2013 applications teaching from future perspective

Based on the findings presented in Table 7, it is obvious that the students understand the need for teaching applications AutoCAD 2013 combined with the creation of 2D and 3D technical drawings, because 42% of them expressed a positive belief concerning the future use of the outputs of this instruction.

Although there is a statistically significant difference ($p = 0.000381$) between the frequency of responses given by boys and girls, in general both girls and boys consider the AutoCAD 2013 application of low benefit for their future lives.

The last area of investigation was focused on the question whether the students perceive a change towards better understanding of the principles and functioning of computer equipment and software tools thanks to the lessons of the creation of 2D and 3D technical drawings in AutoCAD 2013, in other words, whether the students understood better other subject matters related to ICT. A summary of the outcomes based on their responses is illustrated by the Table 8 below.

Contingency table for: n = 301 Pearson's chi square: p = 0,245060 Do you think that you understand the operation of computer technology better now?			
Gender of respondents	Boys	Girls	Row totals
No, I do not – frequency	51	87	138 (46 %)
Yes, I do - frequency	71	92	163 (54 %)
All groups - frequency	122	179	301 (100 %)

Table 8: Better understanding of the principles and the operation of computer technology

Based on the findings presented in Table 8, it is more than obvious that the students now understand the functioning of computer technology better than it was before the implementation of the teaching of AutoCAD 2013 applications. Experimental learning content thus developed the students' knowledge and skills in the field of the creation of 2D and 3D drawings, and related interdisciplinary links between mathematics and chemistry. Moreover, it contributed to a deeper understanding of the principles and operation of ICT, and its possible use.

Furthermore, it is possible to conclude that there was no statistically significant difference ($p = 0.245060$) between the frequency of responses given by girls and boys, and therefore these two groups share the same opinion.

CONCLUSIONS

The above described experimental educational content focused on an enrichment of the teaching of mathematics and chemistry with a practical application of the computer-aided technical drawing, represents an innovative way of using modern information and communication technologies in education. As it is obvious from the above described research, the experiment and its impacts positively influenced the formation of key educational activities for students in upper secondary education, and at the same time increased the qualifications of teachers of 6 and 8 year grammar schools, where the experimental education was implemented.

The benefits and added value for the teachers was gaining new skills, expansion of professional skills, a significant improvement in the conditions for the preparation and implementation of the teaching of technically oriented graphics systems and, last but not least, a free access to the relevant electronic educational materials.

With respect to students, the experimental educational content offered them an opportunity to learn about and improve in the field of creating 2D and 3D drawings in AutoCAD 2013 system. They were enabled to develop individual skills in a new way, to solve tasks in a more attractive way and independently, based on the acquired knowledge of work with ICT, to use all means of communication effectively and creatively, and, last but not least, to accept responsibility for their own work. As a whole, all these skills can significantly contribute to the wider adaptability of students in further studies at universities.

References

- Gavora, P. (2000). *Úvod do pedagogického výzkumu*. Brno: Paido.
- Granath, J. (2003). Design theoretical approach to learning in technology – a way to enhance interest in future professional studies. In *Teoretyczne i praktyczne problemy edukacji technicznej i informatycznej*. Rzeszów: Wydawnictwo Oświatowe FOSZE, p. 128–139.
- Grečmanová, H. et al. (2000). *Podporujeme aktivní myšlení a samostatné učení žáků*. Olomouc: Nakladatelství HANEX.
- Chráska, M. (1988). *Empirická pedagogická šetření a jejich statistické vyhodnocování*. Olomouc: Vydavatelství Univerzity Palackého.
- Idrus, H., Mond, D. H., & Abdullah, N. (2010). Integrating critical thinking and problem solving skills in the teaching of technical courses: The narrative of a Malaysian private university. In *Engineering Education*. Kuala Lumpur, 5(2), 258-263.
- Jirotková, D. (1990). *Rozvoj prostorové představivosti žáků*. Komenský 5(1).
- Klement, M. (2003). *Grafické programy a multimédia - AutoCAD 2000*. Olomouc: Vydavatelství UP Olomouc.
- Klement, M., & Kubrický, J. (2014). Možnosti výuky systému AutoCAD 2013 na víceletých gymnáziích. In *Trends in Education: Information Technologies and Technical Education*. Olomouc, 2014(1), 202-209.
- Klímeček, P., Stříž, P., & Kasal, R. (2009). *Počítačové zpracování dat v programu STATISTICA*. Bučovice: Martin Stříž.
- Kropáč, J. (2004). K problému uceleného pojetí výuky obecně technických předmětů. In *e-Pedagogium*, 4(1), 32-48.

- Manullang, B., & Kons, S. M. M. S. (2012). The integration of soft skill and hard skill in learning revolution. In *Education Technology and Computer. Shanghai*, 3(1), 436-439.
- Mojžíšek, L. (1981). *Pracovní výchova, polytechnické vzdělání a profesijní orientace: Systém a subsystemy pracovní výchovy*. Brno: UJEP.
- Zubatá, A., Plischke, J., & Kropáč, J. (2011). Výuka technických předmětů, zkušenosti žáka a jeho kariérové rozhodování. In *XXIV. DIDMATTECH 2011*. Kraków. Uniwersytet Pedagogiczny, p. 96-102.

The Psychological Dynamics Of Effective Teaching

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ABSTRACT

In every professional field there are techniques and skills constantly developing day by day. Teaching is not merely a profession but also a passion for many as it is a sharing of the precious gift of one's knowledge and ideas and one's own self. ... "his heart lies in being an educator and doing something worthwhile" (Beetlestone 1998, p.IX). Hence there evolves a *psychological dynamics* of developing the entire person, the result of which is *effective teaching*. In this article we enumerate the qualities of teachers as educators, progressively making an educational presence in the lives of the students.

Keywords: Psychology, Teacher, Skills of teaching, Classroom management, Student-teacher Relationship, Education.

INTRODUCTION

The Psychology of teaching is an in-depth sharing of one's very self. It is a choice and a commitment. It is a commitment in character formation, and a personal choice of career that touches the heart of the teacher and the students. The dynamics of teaching is not merely a technique, but "**teaching is an ART.**" "In my educator heart, I want to see teaching as an art." (Flanagan 2014) The core of the teaching skills, techniques, and the art of teaching, lies in the *HEART* of the Educator. "The goal of classroom management is to maintain a learning environment that allows for positive interaction, access to learning, and enhanced student achievement. Effective teachers are strong leaders in managing behavior, instruction, and student concerns." (Aloe et al. 2013. p.105) The psychological process of effective teaching involves the whole person, penetrating the *psyche* of both the teacher and the students. The teacher is not just one who teaches some subjects in the classroom only, but an educator in overall perspective. Yet the oft used word in academic sense is "*teacher*", which should be well substituted with an appropriate and a comprehensive term of "**educator.**" However, in this article we use the term "**teacher**". "Teachers are important adults in children's scholastic lives, and there is some evidence that teacher wellbeing, at least indirectly, has significant effects on children's socio emotional adjustment and academic performance" (Hamre et al. 2004. p.297. and Spilt. 2011. p.458)

1. Clarifying some basic concepts

Who is considered to be a teacher?

i) In a generic term a teacher is one who is endowed with the quality to share the knowledge to anybody who comes in contact with that person, with a process of interactive communication. Teaching is "an interactive process that occurs between teacher and student who must both participate actively in the process" (Pol et al. 2010. p.274)

ii) In a formal term a teacher is one who is qualified to teach. The qualification is specific to the level of teaching, be it for the school (teacher), or for the college (lecturer), or university (professor). (Day and Leitch 2001; O'Connor 2008; Spilt et al. 2011. p.461).

iii) In the simplest form of the word a teacher is one who teaches what he knows whether qualified or not qualified. But (s)he should aim at becoming professional teacher. (Roth et al. 2007)

Hence what is basically running through in every definition is a communicator and a co-operator. The whole process of learning is between a **learner** and the one who imparts knowledge, a **teacher**.

Therefore the fundamental question regarding the art of effective teaching is *what the teacher is composed of? The psyche of the teacher?* What really the teacher **is** in himself/herself more than what he/she **has**? "Teacher self-efficacy is the extent to which a teacher believes that (s)he is able to teach even the most difficult and unmotivated students, and involves many dimensions of teacher practices" (Aloe et al. 2013. p.105). Only after that we can consider what the teacher **wants** to do with what (s)he has? Hence the teacher should verify essential concepts regarding teaching.

1.2. Personal verification of essential concepts

i) The teaching profession is basically a *personal desire* for communication, which is the core of effective teaching. This desire is not limited with *feelings* but originates from the depth of the heart of the person. Hence, the one who wants to be a teacher should really acquire a deep compassionate heart for the students to whom the communication is aimed at. In every teacher “there are three universal, innate psychological needs: for autonomy (ownership, responsibilities, and self-actualization), belongingness (close relationships, interpersonal regard, and support), and competence (feeling capable to bring out desired outcomes and effectively cope with challenges) (Deci et al. 2000 and Spilt. 2011. p.462) these are to be spelt out in action as teaching techniques.

ii) Secondly at the beginning of one’s teaching career, the teacher should really ask this question “*what do I want to do as a teacher*”? Is it some learning material that one wants to dump it into the heads of the students who are under your control? Or does the teacher have some seeds to be sown on the fertile minds of the students who are there in front, not knowing exactly what is going to come from the teacher, and how it is going to come. (Greene et al. 2002)

iii) Therefore the key role of psychology in the art of effective teaching begins from one’s Heart. Once her/his heart establishes a resonance with the minds of the students whom (s)he is going to encounter, the skill can be acquired easily to fashion and mold the versatile minds of the students. (Mashburn et al. 2006; Spilt 2011. p.461). Effective teaching is not one way, but an interactive stimuli-response communication between two hearts and minds.

2. Dos and Don’ts

To have a Psychological ascendancy over what we call *skills or techniques of effective teaching*, is to keep in touch with one’s own personal preparation before getting to teach. There are various little things that a teacher has to personalize, the common sense, that has evolved into norms of expertise indications of Dos and Don’ts.

Here are few of Dos.

- i) Do prepare the lesson well before you go to teach. A fundamental obligation.
- ii) Present yourself decently in dress, in cleanliness and appearance.
- iii) Prepare your mind to face the students in a friendly way.
- iv) Arrive at the class punctually if not a few minutes before the scheduled time.
- v) Be calm as you enter the class in whatever condition you find the students are.
- vi) Smile at the students even before they greet you.
- vii) Take a glance at every face of the students if possible while responding to the greetings.
- viii) As soon as the students settle down strike a brief conversation of the current happenings; maybe of the school, or the climate, or the society, or about your very self. While having a brief acclimatization get closer to the topic of your lesson.

The above mentioned dos are basic etiquette which in turn will make a deeper psychological impact on the students, “...teachers construct mental models of their relationships with students that represent teachers’ views, feelings, and inner world regarding their teaching” (Pianta et al. 2003. p.199 and Spilt. 2011. p.463).

Furthermore the teacher should aim at, “instruction, adapting education to fit students, motivating students, keeping order and discipline, cooperating with colleagues and parents, and coping with changes and challenges.” (Skaalvik et al. 2007. p.99, and Aloe et al. 2013. p.105). Thereby, one should avoid the obstacles and barriers that may ruin effective teaching.

Here are some don’ts

2.1. Do not go to the Class half prepared. In case you are not prepared with your lesson for teaching, you could always keep the students engaged with revising the lessons or letting the students read by themselves. This is most productive and liked by all the students; a moment of self-study. Or an un-announced class test to give the students to check how much they grasped the previous lessons. (Turner et al. 2005; Van de Pol et al. 2010. p.275)

2.2. Don’t be late for class constantly. Punctuality of the teacher is a great disciplinary education that the students learn from the teacher. If you are not punctual the message goes deep into the minds of the students that you live with double standard. (Maloch. 2008; Oh. 2005; Van de Pol. 2010. p.279). By being constantly late you give an impression that you lack discipline yourself. That you don’t mean to educate the students, but just to fulfill some obligation of entering the class.

2.3. Don't carry your troubles to the class. In case you had a row with your family or your colleagues or whatsoever your problem, leave them all outside the class. Don't project your problems on to the students or on the lesson. (Reley 2009; Spilt 2011)

2.4. Don't begin the class with agitation in case your students are agitated and disturbed. "Poor relationships go against this need for relatedness and make teachers vulnerable for personal failure and rejection by students." (Spilt et al. 2011. p.465). The students are fun-loving they will try to provoke the teachers to make their life enjoyable. Not all students are studious. Some come to class only because there is no other go. Hence your agitation becomes a reason for creating more disturbances in the class.

2.5. Don't begin the teaching with reprimand. This will ruin the whole class. The minds of the students are fertile, vulnerable and fragile. It can be molded and formed according to the environmental conditions both positively and negatively. "Disobedient student behavior, for instance, is more likely to be appraised as challenging and threatening when the teacher has internalized negative feelings about the relationship." (Pianta et al. 2003; Spilt et al. 2011. p.467). Hence if the teacher does not set a tone of educative ambient, the students are left high and dry. The moral condition of learning drops down very low.

2.6. Don't always expect that all the students will greet you whole heartedly. Hence no flowers will bloom if you keep your face gloomy or stern. Don't consider yourself as the centre of the universe or centre of your class. (Mercer et al. 2004; Van de Pol. 2010. p.280) The students are centre, you are only a facilitator. A best teacher is a best facilitator of learning process.

2.7. Don't start the lesson with a difficult jargon. The minds of the students are to be gradually led to grasp the crux of the problem. Hence to start with a difficult note will sometimes make the students get lost. So you need to prepare the ground before sowing the seed of learning. The teacher should be alert in 'monitoring and checking students' understanding' (Garza 2009). We must remember the student attends various lessons from different teachers in a day. Hence your lesson should have its own plowing for irrigation if you intend to produce fruits through your teaching.

Having said about the *Dos and Don'ts*, let's pose few basic questions about effective teaching.

3. Psychological parameter of effective teaching.

The psychology of effective teaching is the self fulfillment of the teacher and the collective growth of the students, in other words, the efficacy of the teacher. Broadly the teachers self efficacy can be compressed into "instructional efficacy, engagement efficacy, and classroom management efficacy." (Aloe et al. 2013. p.105). Thus the effective teaching skills can be categorized and developed into three aspects. A) The subject of teaching. B) The ambient and the mode of teaching. C) The students, the primary goal of teaching.

3.1. The subject of Teaching

3.1.1. The subject, which is the substance of teaching, takes a prominent role. The matter matters a lot. Not all subjects are taught in the same way. The nature of the subject calls for its own preparation and presentation. The quality of teaching lies in the preparation. The productivity of the teaching lies in the presentation. "...coherent and learner-centered curriculum." (Ten Dam et al. 2004; Spelt et al. 2009. p.367). So the subject has to be given its due importance according which the skill should be acquired. Therefore, we consider the following steps to be kept in mind as part of the teaching technique.

3.1.2. Know your stuff. As mentioned above, the material of the subject to be taught is an important component of teaching. If the teacher does not grasp the material that is to be taught then the whole teaching process fails in its purpose. (Pawan 2008; Cole 2006; Van de Pol. 2010. p.279). Even if the teacher has multiple skills to teach but if he/she does not have the matter, all the skills will hold no water. Hence the a-priori requisite for the teacher is to make sure that he/she has well assimilated the subject to be taught. The content of the teaching has to be part and parcel of the teacher.

3.1.3. The matter to be taught should be well structured logically.

3.1.4. The material should not be complicated, instead it should be simplified. This does not mean that the whole content is reduced to nothing. There should be complexity in the matter that gives challenge to the students to grapple with the subject.

3.2. The ambient and the mode of teaching.

The style of teaching, the methods used in the class and the teaching setting can be collectively termed as the ambient of reaching. "Realizing desired learning outcomes demands consistent and well-designed learning environments." (Ten Dam et al. 2004; Spelt et al. 2009. p.367). It's here the skill is also utilized as teaching techniques. The teacher actually exhibits and reveals his strengths and weaknesses, his best and worst qualities in this context.

3.2.1. *The ambient*: The **Ambient** can be created by the teacher in most cases. But not always possible to create a desired physical condition beyond the given setting of a class room in most cases. Yet the teacher has to make sure that the teaching ambient is appropriate before beginning to teach.

3.2.2. *The mode*: the mode of teaching also depends on the ambient. If for instant there is a projector or if there is black board the mode of teaching should be adapted accordingly.

3.2.3. *The audibility*: At all cost the teacher should be **audible**. There is no substitute for this basic need of teaching. Whatever the teacher communicates should reach the students.

3.2.4. *The undulation of the voice*: During the course of teaching to draw the attention of the students the teacher should **undulate** his voice. It is one of the effect skills that the teacher should acquire. Monotonous voice is something that the students loath. The voice of the teacher is something that captivates the attention of the students in the classroom ambient.

3.2.5. *Clarity in expression*: The **clarity** of the words that the teacher uses should be optimum. There shouldn't be any mumble-jumble while teaching. The clear the teacher in his expression, the better the students grasp the point that is communicated. Clarity in the words, clarity in the pronunciation, clarity in the thought, clarity in the material that is taught, clarity in logic.

3.2.6. *Precision in communication*: To be **precise** in communication is another character of a good teacher. The concept that has to be communicated to the students must be precise and to the point. If the teacher is not comprehensive the students will have to spend more time and energy to grasp the theme of the subject that is being taught. An indication of being precise is seen in summing up the whole content of the day's class. If you, as a teacher, is able to sum-up the entire lesson of the day in few sentences then you understand yourself how precise you are. Precision is nothing but, be short, be crisp and stop.

3.2.7. *Mannerisms*: Avoiding **mannerisms** is another skill of teaching. There are many habits that are destructive and digressive in teaching career. The less mannerisms the better distractions, because mannerisms is an indicator that the teacher is not having control of himself/herself. Hence its important to take efforts to find out what are the mannerisms that one has in order to eliminate them. For example, removing the spectacles every minute and putting back, pulling the tie all the time, adjusting pants or the shirt often, clearing the throat every second, shifting the legs right and left constantly, and repetition of some slangs and words such as, "*practically speaking, practically speaking... practically speaking... what you call, what you call, what you call,...*" etc.

3.2.8. *Mobility*: Stationary and physical stagnancy is a drawback of a teacher. If the teacher is only seated from the beginning of the class till its end or stationed only in one position like an **unmoved mover**, is not so productive for the classroom teaching. "Monitor students carefully and frequently so that misbehavior is detected early before it involves many students or becomes a serious disruption." (Kizlik 2014) The teacher should once in a while move into the class or the lecture hall if possible. The closer the teacher to the students in every sense the better the rapport between teacher and the students. "Moving close to the offending student or students, making eye contact and giving a nonverbal signal to stop the offensive behavior." (Ibid.) If the teacher never comes down from his teaching pedestal to the level of the students even in the physical structure of the class room the students will have their own game which the teacher will not be aware of. "Effective classroom managers practice skills that minimize misbehavior." (Kizlik 2014). So it's better to go towards the students periodically to get to know the students and their activities during the class.

3.3. The students, the primary goal of teaching.

"When considering the measurement of teachers' interpersonal experiences with students, it is worthwhile to take the multidimensionality of teachers' relationship perceptions into account. Teacher perceptions of student – teacher relationship quality embody relatively independent dimensions referring to close and warm aspects of the relationships." (Spilt et al. 2011. p.471).

3.3.1. The focus of the teaching skill lies in the psychological bond between the students and the teacher. "The strong connection between the personal and professional wellbeing of teachers and have reasoned that there cannot be real professional development without personal development..." (Day and Leitch 2001; O' Connor 2008; Spilt 2011. p.461). The teacher should primarily establish a dignified, cordial, educative relationship with the students. The students – teacher relationship is a vital aspect of teaching reality. All the skills of teaching would be considered a farce if the real target of teaching, that is the students, is not taken into main consideration. Hence the teacher should be ready to meet all sorts of students with a heart of an educator, as mentioned earlier.

3.3.2. The students are of different intellectual capacities. Not all students will be able to grasp the point that you are driving at in the class. And not all students are dull heads either. "Understanding of mind and its development to organize instructional content across diverse subject matter and to create teaching methods that are appropriate for different individuals at different phases of learning". (Demetriou et al. 2011. p.602). Therefore to keep the senses alert to notice the weak students and the bright students who are in the class and

give due attention to the needs of both the category of the students, which calls for a close observation of the students in the class like a mother who knows each child intuitively, the various needs of the children.

3.3.3. There are students who are very studies and there are those who are very playful and trouble makers. This difference of temperaments and behaviors of students often get on the nerves of the teachers. This could be a cause of distraction and disappointment and disturbance for the teacher even to proceed teaching with peace of mind. “Teachers’ mental representations of relationships with individual students are a more powerful predictor of teacher wellbeing than perceived student misbehavior”(Spilt et al. 2011. p.472). Some students listen to the teacher attentively and eagerly while others are bent on disturbing and playing mischief. This is what causes the conflict between the teacher and students. The teacher may show the displeasure on the whole class instead of dealing with the particular student who is the cause of disturbance. Hence the delicacy and tactful way of approaching the student who disturbs. This is one of the great efficacies of the teacher.

3.3.4. Finally, the essence of teaching is not just the material to be taught but to educate the student in holistic sense. The mind of the student is only a part of the personality. Hence a teacher has an important role to play as an educator of the entire person who confides in his hands. “There is also some evidence from descriptive and correlational research that confirms the importance of healthy teacher – student relationships for the wellbeing of teachers” (Shann 1998; Spilt 2011. p.461). This is possible only with the heart of an educator. The psychology of teaching and learning is a relationship of sharing knowledge in the depth of the human heart. “Deliberately focusing attention on positive feelings such as compassion, warmth and care for self and others.” (Waters et al. 2014. p.3) Once this communication is established the knower and the known merge to comprehend each other. This is the art of teaching.

References

- Aloe, A. M., Amo, L. C., & Shanahan, M. E. (2013). *Classroom Management Self-Efficacy and Burnout: A Multivariate Meta-analysis*. New York, Published online: 14 November 2013, Springer Science and Business Media.
- Cole, A. D. (2006). *Scaffolding beginning readers: Micro and macro cues teachers use during student oral reading*. Reading Teacher, 59, 450 – 459
- Day, C., & Leitch, R. (2001). *Teachers’ and teacher educators’ lives: The role of emotion*. Teaching and Teacher Education, 17, 403 – 415.
- Deci, E. L., & Ryan, R. M. (2000). *The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior*. Psychological Inquiry, 11, 227 – 268.
- Demetriou, A., Spanoudis, G., Mouyi, A. (2011). *Educating the Developing Mind: Towards an Overarching Paradigm*. Springerlink.com. Published online: 13 September 2011.
- Flanagan, N. (2014). *The Age-Old Question. Teaching: Art or Science?* http://blogs.edweek.org/teachers/teacher_in_a_strange_land/2014/08/the_age-old_question_teaching_art_or_science.html (August 13, 2014 updated) downloaded Jan 2015
- Garza, R. (2009). *Latino and white high school students’ perceptions of caring behaviors: Are we Culturally responsive to our students?* Urban Education, 44, 297 – 321.
- Greene, R. W., Beszterczey, S. K., Katzenstein, T., Park, K., & Goring, J. (2002). *Are students with ADHD more stressful to teach?: Patterns of teacher stress in an elementary school sample*. Journal of Emotional and Behavioral Disorders, 10, 79–89.
- Hamre, B. K., & Pianta, R. C. (2004). *Self-reported depression in non familial caregivers: Prevalence and associations with caregiver behavior in child-care settings*. Early Childhood Research Quarterly, 19, 297 – 318. 474 Educational Psychology Review (2011) 23:457 – 477
- Kizlik, B. (2014). <http://www.adprima.com/managing.htm> downloaded on 28th Jan 2015.
- Maloch, B. (2008). *Beyond exposure: The uses of informational texts in a second grade classroom*. Research in the Teaching of English, 42, 315 – 362
- Mashburn, A. J., Hamre, B. K., Downer, J. T., & Pianta, R. C. (2006). *Teacher and classroom characteristics associated with teachers’ ratings of prekindergartners’ relationships and behaviors*. Journal of Psycho-educational

- Assessment, 24, 367–380.
- Mercer, N., Dawes, L., Wegerif, R., Sams, C. (2004). *Reasoning as a scientist: Ways of helping children to use language to learn science*. British Educational Research Journal, 30, 359 – 377
- O’ Connor, K. E. (2008). “*You choose to care*”: Teachers, emotions and professional identity. Teaching and Teacher Education, 24, 117 – 126.
- Oh, P. S. (2005). *Discursive roles of the teacher during class sessions for students presenting their Science investigations*. International Journal of Science Education, 27, 1825 – 1851
- Pianta, R. C., Hamre, B., & Stuhlman, M. (2003). *Relationships between teachers and children*. In W. M. Reynolds & G. E. Miller (Eds.), *Handbook of psychology: Educational psychology* (Vol. 7, pp. 199 – 234). Hoboken: Wiley.
- Riley, P. (2009). *An adult attachment perspective on the student-teacher relationship & classroom management difficulties*. Teaching and Teacher Education, 25, 626–635.
- Roth, G., Assor, A., Kanat-Maymon, Y., & Kaplan, H. (2007). Autonomous motivation for teaching: How self-determined teaching may lead to self-determined learning. Journal of Educational Psychology, 99, 761–774.
- Shann, M. (1998). *Professional commitment and satisfaction among teachers in urban middle schools*. The Journal of Educational Research, 92, 67 – 73.
- Skaalvik, E. M., & Skaalvik, S. (2007). *Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout*. Journal of Educational Psychology, 99, 611–625. doi: 10.1037/0022-0663.99.3.611.
- Spelt, E. J. H., Biemans, H. J. A., Tobi, H., Luning, P. A., Mulder, M. (2009). *Teaching and Learning in Interdisciplinary Higher Education: A Systematic Review*. Published online: 10 November 2009. Springerlink.com
- Spilt, J. L., Helma, M. Y., Koomen and Thijs, J. T. (2011). *Teacher Wellbeing: The Importance of Teacher – Student Relationships*. Published online: 12 July 2011, Springerlink.com.
- Turner, V. D., & Berkowitz, M. W. (2005). *Scaffolding morality: Positioning a socio-cultural construct*. New Ideas in Psychology, 23, 174 – 184
- Ten Dam, G., Van Hout, H., Terlouw, C., & Willems, J. (2004). *Onderwijskunde hoger onderwijs*. Assen: Koninklijke Van Gorcum. In Spelt et al. (2009). *Teaching and Learning in Interdisciplinary Higher Education: A Systematic Review*. Published online: 10 November 2009. Springerlink.com
- Van de Pol, J., Volman, M., Beishuizen, J. (2010). *Scaffolding in Teacher – Student Interaction: A Decade of Research*. Published online: 29 April 2010. Springerlink.com
- Waters, L., Barsky, A., Ridd, A., Allen K. (2014). *Contemplative Education: A Systematic, Evidence-Based Review of the effect of Meditation Interventions in Schools*. Published Online 04 March 2014. Springerlink.com.

The Relationship Between Skills Of Reading Comprehension And Establishing Relations Of Coherence And Cohesion In Written Expressions Of Secondary School Students

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ABSTRACT

This study aims to determine the relationship between skills of reading comprehension and establishing relations of coherence and cohesion in written expressions of good and poor readers. Out of general screening models, relational screening model was selected and used in the study. Accessible population of the study is composed of 8-grade students receiving education in Kırşehir city center. As for sampling, 131 students were selected randomly from three secondary schools. An achievement test was prepared to determine the students' levels of reading comprehension. In order to assess their success in the criteria of coherence and cohesion, the students were asked to write a composition. The students' works of written expression were evaluated according to these two criteria of textuality. Results indicate a significant difference between good and poor readers' levels of reading comprehension and their skills of using coherence elements and setting cohesive relations in written expressions. Good readers use coherence instruments more successfully and constitute better cohesion than poor readers do while composing texts.

Keywords: Coherence, cohesion, reading comprehension

INTRODUCTION

Researches show that language is not just a communication tool made up of individual words but it is a system built of closely interrelated units valued by each other. Therefore, limiting all linguistic studies to sentences may be an unhealthy approach (Aydın, 2007).

Text linguistics is a branch of science that deals with texts in their entirety as a supra-sentential unit as elaborated in linguistic studies today. It is an approach to analyse a text in its structural and semantic integrity and to understand the main constituents of a text. While semantics and rhetoric gravitate toward the power of meaning, text linguistics tries to unfold the interrelation between these semantic groups (Aytaş, 2008).

In Western countries, text linguistics is used in studies of text reading and comprehension, constructing texts in teaching foreign language, teaching writing in mother tongue, and improving writing skills (Ayata Şenöz, 2005).

In order for a piece of writing to be called as a text, it needs to include certain criteria in company. The extent to which a piece of writing observes these criteria determines its quality of textuality. De Beaugrande and Dressler (1981) regards coherent and cohesion among the essential criteria of textuality.

According to Halliday and Hassan (1976), cohesion denotes lexical and grammatical relations that enable us to perceive a combination of sentences as a discourse rather than independent sentences. Cohesive elements convey the meaning and build a sort of semantic integrity between textual units. Cohesive relations can be observed in the same sentence or between consecutive sentences, sometimes between nonconsecutive sentences in a paragraph or between paragraphs within a text (Can, 2012).

In the early studies on text linguistics, cohesion was defined as a link comprising all sorts of suprasentential grammatical and lexical relations between sentences that make up a text. However, grammatical relations between sentences have been treated in the context of coherence later on, and cohesion has been considered as a lexical and logical connection within a text (Toklu, 2009).

Onursal (2003) points out that coherence and cohesion are different from each other in terms of their levels even though they are interrelated and integrate each other within a text. While coherence can be seen in the surface of a text through linguistic elements, cohesion denotes the logical connections between meanings in the deep structure of a text and there are not certain linguistic elements that are indicative of cohesion. Sometimes a whole text or different parts of a text may be cohesive without linguistic elements ensuring coherence.

Although there are extensive and various studies on reading-writing relationship, those relations can be grouped into three: rhetorical relations, procedural relations, shared knowledge and cognition (Fitzgerald and Shanahan, 2000).

Reading and writing skills are closely interrelated. A great deal of studies indicate that children's performance in writing can accurately reveal their reading knowledge and process (Cox and Shanahan, 1990). In the same vein, Eckhoff (1983), argues that one's achievement in written expression can be predicted by his/her reading scores.

Reading contributes to students' writing skills in several ways. First of all, it informs students about what they will write and, on the other hand, it functions as the first model by which reading and writing skills can be learned (Zainal and Husin, 2011).

As a skill, both reading and writing necessitate grammar, i.e. knowledge of coherence as well as cohesion. Grammatical knowledge is shared between reading and writing especially in sections including orthographical, semantical, syntactical, rhetorical, and structural analysis (Shanahan, 1984).

Text is the common area of interest for studies of text linguistics, reading comprehension, and writing. According to structuralists, understanding a language is an interactive process between a text and its user. They argue that a text itself does not carry any meaning; it is the reader who can get the meaning via the contribution of that text (Parvaz and Nodushan, 2006). Since reading is an interactive and communicative activity, the most effective learning environment should be a place where children and adults share a text, recognise the author behind that text, and inquire the thoughts and linguistic choices of its author. In this way, they will be more aware of rhetorical organisation (Anderson, 1990).

Studies on reading comprehension show that coherence instruments function as a focus for readers to associate the meaning in a text (Cox and Shanahan, 1990). Studies on writing indicate that coherence instruments significantly contribute to improving the quality of written expression (Cox, 1987).

Based on previous studies, this paper aims to uncover whether there is a relationship between good and poor readers' reading comprehension skills and their ability to interrelate the criteria of coherence and cohesion in their written expressions. In reference to the research problem, we tried to answer the questions below:

1. Is there a difference between good and poor readers' reading comprehension skills and their ability to establish relations of coherence in their written expressions?
2. Is there a difference between good and poor readers' reading comprehension skills and their ability to establish relations of cohesion in their written expressions?
3. Is there a relationship between good and poor readers' reading comprehension skills and their ability to establish relations of coherence in their written expressions?
4. Is there a relationship between good and poor readers' reading comprehension skills and their ability to establish relations of cohesion in their written expressions?

2. METHOD

2.1. Research Model

With the aim of examining the possible relationship between good and poor readers' reading comprehension skills and their ability to interrelate the criteria of coherence and cohesion in their written expressions, relational screening model was used in the present research. Among general screening models, relational screening model is used to determine the existence and/or the extent of covariance between two or more variables (Karasar, 2009)

2.2. Participants

2.2.1. Formation of the Research Population

Accessible population of the research is composed of 8-grade students receiving education in Kırşehir city center. As for sampling, 161 students were selected randomly from three secondary schools. While selecting this sampling, the researcher cared to choose students with high, medium, and low socio-economic levels.

2.3. Goal of the Research

By making use of previous research, this study aims to reveal whether there is a relationship between good and poor readers' reading comprehension skills and their ability to interrelate the criteria of coherence and cohesion in their written expressions. New approaches to the relationship between reading and writing skills can be put forth in this way.

2.4. Data Collection Tools

In order to determine the students' reading comprehension levels, a 30-question achievement test was prepared by using the student placement exams carried out by the Ministry of National Education in different years in placing 8-grade students to high schools. As for measuring their achievement in coherence and cohesion, the students were asked to complete a work of written expression, choosing one out of five topics so as to accomplish their work with ease.

While selecting the topics for written expression work and preparing the achievement test, we asked the opinions of two specialists on Turkish Language and Literature and two Turkish Language teachers.

2.5. Validity and Reliability of Data Collection Tools

Table 1. Analysis Values for the Validity and Reliability of Achievement Test

	Reading comprehension achievement test
Number of items	30
P (Difficulty index)	0,65
T-value for top and bottom	25,082
27 % (Discrimination)	($p < 0,05$)
Kuder Richarson 20 (KR-20)	0,75

In order to assess the validity and reliability of the achievement test, a pilot study was carried out with a group of 100 students. Item difficulty indexes of achievement test were calculated at first. Difficulty index was 0,65 for the 30 items in the reading comprehension achievement test. Item difficulty indexes are expected to have values ranging from 0 (zero) to +1. The closer the value of an item difficulty index is to +1, the more correctly it answers; and the closer it is to 0, the less correctly it answers. An ideal assessment tool has an item difficulty index with an overall value of 0,50 (Ozcelik, 2010).

The values calculated for the achievement test in the scope of this research were closer to 0,50 as a desired indicator of the validity and reliability of our assessment tool. In addition to this, means of top and bottom 27 % were calculated for each achievement test. Their t-values yielded the significant value for each item. This result shows that each item is enough to discriminate the achievement of students.

KR-20 reliability coefficient of the achievement tests was computed as 0,75 for reading comprehension. Reliability coefficients of assessment tools range from 0 to 1. A coefficient is accepted as considerably reliable if it has a value between 0,60 and 0,80 (Kalaycı, 2009). As the values for achievement test in this research were in this range, it can be concluded that the items of our assessment tool produced considerably reliable results.

2.6. Data Collection Process

Students with different socio-economic levels were selected from three secondary schools in Kırşehir city center. 161 students participated in the research in total. 50 of them were from Cumhuriyet Secondary School, 59 from Cacabey Secondary School, and 52 from Vali Mithat Saylam Secondary School. All the tests were applied to students by the researcher himself. After the necessary explanations about the achievement test, students were asked to answer 30 questions during a course time (40 minutes). In the second course time, they were asked to complete a work of written expression. The data collection tools were coded in order to specify which achievement test and composition paper belong to which student. Lastly we proceeded to analysing the data after matching the achievement tests and texts belonging to the same students.

2.7. Data Analysis

SPSS 17.0 software package (Statistical Package For Social Sciences) was used for data analysis. Students were classified as either good or poor readers according to their scores on the achievement test for reading comprehension skills. Those who answered 68 % of the questions correctly were evaluated as good readers, the remaining ones being evaluated as poor readers (Bridge and Winogard, 1982).

Students' works of written expression were evaluated by two researchers. "Cohesion Evaluation Scale" developed by Can (2012) was used in determining their cohesion scores. Their achievement in using coherence instruments was evaluated by two researchers upon reading their composition papers. The process ended with a t-test and correlation analysis showing the relationship between the students' scores on the reading comprehension test, cohesion of their composition, and errors of coherence.

3. RESULTS and EXPLICATION

This section of the research includes the results and their explication.

Table 2. Results of Independent T-Test Analysis Showing the Relationship between Good and Poor Readers' Scores on "Comprehension Test and Cohesion Level"

	Reader Category	N	\bar{X}	Ss	T	p
Achievement Test	Poor	67	13,1045	3,84603	19,679	,000
	Good	64	24,1406	2,36286		
Cohesion	Poor	67	8,0896	2,80006	11,782	,000
	Good	64	15,4531	4,23863		

As it is seen in Table 2, the difference between cohesion and achievement test scores of good and poor readers is significant in favour of good readers ($p < 0.05$).

Table 3. Results of Independent T-Test Analysis Showing the Relationship between Good and Poor Readers' Scores on "Comprehension Test and Their Coherence Errors"

	Reader Category	N	\bar{X}	Ss	T	p
Achievement Test	Poor	67	13,1045	3,84603	19,679	,000
	Good	64	24,1406	2,36286		
Substitution Error	Poor	67	,0149	,12217	,977	,330
	Good	64	,0000	,00000		
Conjunction Error	Poor	67	1,3881	1,44553	6,582	,000
	Good	64	,1406	,46691		
Reference Error	Poor	67	1,4328	1,72525	5,660	,000
	Good	64	,1719	,45616		
Lexical Coherence Error	Poor	67	1,6269	1,56511	6,809	,000
	Good	64	,2188	,54827		
Ellipsis Error	Poor	67	1,8806	1,49263	7,671	,000
	Good	64	,3438	,59678		

As seen in Table 3, an evaluation of coherence elements regarding errors of conjunction, reference, lexical coherence and ellipsis in written expressions of good and poor readers indicate a significant difference in favour of good readers.

Table 4. Correlation between Comprehension Test, Cohesion Levels, and Coherence Errors of Good and Poor Readers

		Achievement Test	Cohesion	Reference Error	Lexical Coherence Error	Ellipsis Error	Conjunction Error
Achievement Test	R	1	,754**	-,471**	-,497**	-,437**	-,532**
	P		,000	,000	,000	,000	,000
Cohesion	R	,754**	1	-,385**	-,343**	-,302**	-,489**
	P	-,471**		,000	,000	,000	,000
Reference Error	R	,000	-,385**	1	,423**	,538**	,293**
	P	,000	,000		,000	,000	,001
Lexical Coherence Error	R	-,497**	-,343**	,423**	1	,366**	,307**
	P	,000	,000	,000		,000	,000
Ellipsis Error	R	-,437**	-,302**	,538**	,366**	1	,327**
	P	,000	,000	,000	,000		,000
Conjunction Error	R	-,532**	-,489**	,293**	,307**	,327**	1
	P	,000	,000	,001	,000	,000	

n= 131 * $p < .05$; ** $p < .01$

As seen in Table 4, there is a positive and highly significant relationship ($r = .754$, $p < .01$) between the achievement test scores and cohesion levels as shown by Pearson Correlation Analysis carried out to determine whether there is a relationship between good and poor readers' test scores for comprehension and cohesion. Accordingly, the higher scores students get on the reading comprehension test, the higher scores they get from the evaluation of textual cohesion. As for the evaluation of coherence errors done by good and poor readers, there is a negative and moderate relationship between their achievement test scores and errors of reference and ellipsis but there is a negatively high relationship between their achievement test scores and errors of conjunction and lexical cohesion. According to this, the higher scores students get on the reading comprehension test, the less errors of coherence they do in written expression.

CONCLUSION, DISCUSSION AND SUGGESTION

Results indicate a significant difference between reading comprehension levels and cohesion skills in written expression works of the good and poor readers selected from 8-grade elementary students. This result is in the same vein with Mcgee and Richelss' (1990) argument that readers and writers share common processes related to cohesion such as planning, organising, and aligning in reading and writing activities.

According to the evaluation of coherence elements used by good and poor readers in their written expressions, a significant difference was observed in favour of good readers in terms of conjunction, reference, lexical coherence, and elliptical expression. Good readers are more successful in using those coherence elements when compared to poor ones. Abbot and Bringeer (1993) also enunciate a considerable relationship between one's level of reading skill and the quality of his/her text.

A positively high and significant relationship was observed between the achievement test scores and cohesion levels of good and poor readers. According to this, the higher scores students get on the achievement test, the higher scores they get from the evaluation of textual cohesion. The evaluation of coherence errors done by good and poor readers show a negative and moderate relationship between their achievement test scores and errors of reference and elliptical expression but there is a negatively high relationship between their achievement test scores and errors of conjunction and lexical cohesion. Accordingly, the higher scores students get on the reading comprehension test, the less errors of coherence they do in written expression.

Results of this research indicate that good readers use coherence instruments more successfully and constitute a better cohesion in their written expression than poor readers do. An increase in students' scores of achievement test for reading comprehension considerably correlates with an increase in their scores of coherence and cohesion.

The results of a study by Cox and Shanahan (1990) support the results of this research. According to the researchers, knowledge of coherence is connected with improving children's reading and writing ability. Good readers use simple and complicated functions of coherence in their reading and writing activities more successfully than poor readers do.

In a study aiming to measure the relationship between reading and writing, Eckhoff (1983) states that the features of texts students read are similar to the features of texts they write. The texts written by students who read high-level texts are more detailed, more competent in terms of using linguistic structures, and have a more complex linguistic form than those of students who read low-level texts (Eckhoff, 1983). According to Ahmed (2011), the effect of reading on writing skill is more than that of writing on reading; therefore, changes in students' writing skills can account for the status of their reading skills.

Pointing out the association between writing and reading, Clay (2001) states that writing can help children learn reading. Palmer (2010) also asserts a relationship between not only writing and reading comprehension but also fluency in writing and reading comprehension.

Based on these results of the present research, following suggestions are made:

Coherence not only denotes to what extent a thought is in harmony with other thoughts within a text but also is a model of facilitation for readers in order to associate their thoughts (Lightman et al., 2007). Coherence is important both for the reader to derive a meaning from text and for the author to form an easily understandable text (quoted in Cox and Shanahan, 1990). Therefore, more practices of coherence should be included in curriculum.

Since reading is an interactive and communicative activity, the epicenter of a learning environment should be a sort of place where children and adults share a text, make acquaintance with the author behind that text, and inquire about the thoughts and linguistic choices of its author (Anderson, 1990). How authors set textual connections and associate their thoughts to each other should be demonstrated on texts. Children should be made able to evaluate texts with the criteria of coherence and cohesion. High- and poor-quality texts in terms of

coherence should be presented to them and which elements of coherence make those texts high- and poor-quality should be taught practically.

Findings of text linguistics should be used while selecting texts for coursebooks. Studies supporting this suggestion are available in the relevant literature.

By way of reading and writing, students reinforce the interrelationship between comprehension and text organisation (Zainal and Husin, 2011). Hence, students should be guided to engage themselves more in reading and writing and to see the relationships between these two skills.

Lexical coherence is an important part of reading comprehension and contributes to the formation of semantic continuity (Ebrahimpourtaher and Eissaei, 2013). More works should be put forth to enrich vocabulary in order to make students able to comprehend the connections pertaining to lexical coherence (synonym, superordinate, antonym, tenor, using words from the same concept area) and able to create lexically coherent texts observing those relationships.

Students should be made aware of textual coherence and cohesion while reading and writing. Especially those who are not good at reading comprehension should make more time for reading. They should be enhanced with more knowledge and experience on how relations of coherence and cohesion are established in texts through comparisons between different genres of texts.

In getting children acquire a writing skill, highly coherent and cohesive texts can be introduced as a model until their writing skills effloresce.

References

- Abbott, R., & Berninger, V. W. (1993). Structural equation modeling of relationships among developmental skills and writing skills in primary- and intermediate-grade writers. *Journal of Educational Psychology*, 85, 478-508.
- Ahmed, Yusra, (2011). *Developmental relations between reading and writing at the word, sentence and text levels: a latent change score analysis*. Unpublished Master Thesis. Florida State University College of Arts and Science, Florida.
- Anderson, E. (1990). *The implications of recent research on cohesion for teacher education in reading*. Unpublished PhD. Dissertation Open University, United Kingdom.
- Ayata Şenöz, C. (2005). *Metin dil bilim ve Türkçe*. İstanbul: Multilingual Yayınları.
- Aydın, M. (2007). *Dil bilim el kitabı* (2. Baskı). İstanbul: 3 F Yayınevi.
- Aytaş, G. (2008). *Çağdaş gelişmeler ışığında şiir tahlilleri*. Ankara: Akçağ.
- Bridge, C.A. & Winogard, P. N. (1982). Readers' awareness of cohesive relationships during cloze comprehension. *Journal of Reading Behavior*, XIV, 3, 299-312.
- Can, R. (2012). *Ortaöğretim öğrencilerinin yazılı anlatımlarında paragraf düzeyinde bağdaşıklık ve tutarlılık*. Yayımlanmamış Doktora Tezi. Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
- Clay, M. (2001). *Change over time in children's literacy development*. Portsmouth, NH: Heineman.
- Cox, B. E., Shanahan, T., & Sulzby, E. (1990). Good and poor elementary readers' use of cohesion in writing. *Reading Research Quarterly*, 25,1, 47-65.
- Cox, B.E. (1987). *Cohesion and content organization in the narrative and expository writing of children* (Doctoral dissertation, Northwestern University, 1986). Dissertation Abstracts International (University Microfilm No. DAO 58785).
- De Beaugrande, R., & Dressier, W. (1981). *Introduction to text linguistics*. London: Longman.
- Eckhoff, B. (1983). How Reading Affects Children's Writing. *Language Arts*, 60(6), 607- 616.
- Ebrahimpourtaher, A. & Eissaei, S. (2013). Awareness of lexical cohesive devices in text and reading comprehension. *International Journal of Educational Research & Technology*, 4, 2, 63.
- Fitzgerald, Jill & Shanahan, Timothy (2000). Reading and writing relations and their development. *Educational Psychologist* 35.1: 39-50.
- Halliday M.A.K. & Hassan, R. (1976). *Cohesion in English*. New York: Longman Group UK Limited.
- Kalaycı, Ş. (2009). *SPSS uygulamalı çok değişkenli istatistik teknikleri*. Ankara: Asil Yayınevi.
- Karasar, Niyazi. (2009). *Bilimsel araştırma yöntemi*. Nobel Yayıncılık : Ankara.
- Lightman E. J., McCarthy, P., M., Dufty, D. F., & McNamara, D.S. (2007). Cohesion and structural organization in high school texts. *Flairs Conference, AAAI Press*, 235-240.
- McGee, L.M. & Richgels, D.J. (1990) Learning from Text Using Reading and Writing, in: T. Shanahan (ed.) *Reading and Writing Together: New Perspectives for the Classroom* (Norwood, MA, Christopher-Gordon).
- Onursal, İ. (2003). Türkçe Metinlerde Bağdaşıklık ve Tutarlılık, A. Kıran, E.Korkut, S. Ağildere. (Editörler). *Günümüz Dil bilim Çalışmaları*. Ankara. Multilingual Yayınları, ss. 121-133.

- Özçelik, D. A. (2010). *Ölçme ve değerlendirme*. Ankara: Pegem Akademi.
- Palmer, M.L. (2010). The relationship between reading fluency, writing fluency, and reading comprehension in suburban third-grade students. Unpublished Doctoral Thesis, San Diego State University, San Diego.
- Parvaz, M. H., & Nodushan, M. A. (2006). The effect of text cohesion on reading comprehension. Available on line at: [http:// Karens'linguistic.issues.com](http://Karens'linguistic.issues.com)
- Rivers, W. M. (1968). *Teaching Foreign Language Skills*. (2nd ed.). Chicago: University of Chicago Press.
- Shanahan, T. (1984). The Nature of the Reading-Writing Relation: An Exploratory Multivariate Analysis. *Journal of Educational Psychology*, 76(3), 466-477.
- Toklu, M.O. (2009). *Dil bilime Giriş*. Ankara: Akçağ Yayıncılık.
- Zainal, Z., & Husin, S.H.B.M. (2011). A study on the effects of reading on writing performance among faculty of civil engineering students. [Online] Available:[http://eprints.utm.my/11872/1/A Study On The Effects Of Reading On Writing Performance Among Faculty Of Civil Engineering Students. pdf](http://eprints.utm.my/11872/1/A%20Study%20On%20The%20Effects%20Of%20Reading%20On%20Writing%20Performance%20Among%20Faculty%20Of%20Civil%20Engineering%20Students.pdf)

The Role Of Modern Social-Pedagogical Communication In Education

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ABSTRACT

One of the leading world trends currently serves the realization that the progressive development of society and overcome its problems depend on the state of education and the education of citizens of the state.

Today many states attach great importance to the improvement, development, modernization of the education system at all levels. A special place in the reform process of a modern system of education given to changes in the system of vocational training, which is the idea of the need to find new reserves of training and education of man - an active participant in society transformation.

In recent years, particular importance is the problem of updating the education system, which is closely related to the formation of a competitive labor force.

Preparation of competitive specialist is carried out in the interests of the individual and society. In this regard, currently of particular importance in the management of the process of formation of an effective and innovative communication technologies.

Keywords: education, communications, system, methods, pedagogical support

INTRODUCTION

One of the leading world trends currently serves the realization that the progressive development of society and overcome its problems depend on the state of education and the education of citizens of the state.

Today many states attach importance to improvement, development, modernization of the education system at all levels. The special place in reformation processes of a modern education system is allocated for changes in system of vocational training where is the idea of having to search of new reserves of training and education of the person - an active participant in society transformation.

In recent years special relevance is gained by the problem of updating of an education system which is closely connected with formation of a competitive labor resource.

Training of the competitive specialist is carried out in interests of the personality, society. In this regard now special value is gained by the organization of use in the course of formation of effective, innovative communicative technologies.

There is a real contradiction between the demands of the labor market for highly qualified, competitive specialists with the necessary personal and professional competence and lack of theoretical elaboration of professional educator, aimed at creating a pedagogical and psychological conditions for successful training and development of the student in terms of modern education.

Modern social and pedagogical communication -is a modern system of the personal focused, innovative psychological and pedagogical technologies.

So in the student-centered modern psychological and pedagogical communications in recent years, we consider three close to each other method of communication:

1. method of "the helping relations";
2. method of "pedagogical maintenance";
3. method of "pedagogical support".

In the course of the practical implementation of any technology, student-oriented in particular is always a problem of communication conditions, providing high efficiency used socio-pedagogical technologies: no technology will give positive results, if in a particular situation the organization of education are not met certain requirements, will not be the necessary and sufficient conditions.

Implementing modern methods of socio-educational communications teacher initially tends not to lead a student for not control it and its development, and follow the pupil, to create conditions for self-identity and self-realization, to assist him.

This logic assumes that the mentor, beginning the work with pupils, shouldn't aspire to initially to define the purposes, ways and means of its education, the first problem which is solved by the teacher – acquaintance to the pupil, establishment with it the productive communication which is based on mutual respect, trust and interest on

an ideal– and on mutual love. Establish contact with him, talking to him, decides to mentor the second task - trying to know the student. He seeks to understand, what requirements and abilities the pupil already has, what motives of his behavior, than he is interested. The teacher tries to understand in what the deep personal potential of each person consists, to catch the situational actual interests arising at it, to define, what problems and why torment the pupil, to establish their reasons. Only having solved these tasks, the mentor acting within model of modern social and pedagogical communications can take the following steps in pedagogical work with pupils. These steps can be carried out in three main directions.

First, they can be connected with the pupil in knowledge of, in understanding of the experience, in judgment of the interests and opportunities. On this basis the teacher helps the ward to define and verbalize the purposes of own development, advance in life, proceeding not from the ideas of what has to become the pupil, and from the internal potential of the ward, his experience of activity. Having formulated together with the pupil of the purpose of his education, to be exact, having given it the opportunities allowing to define independently these purposes and having promoted the pupil in it, the tutor helps to reach them, creating for this purpose necessary conditions.

Secondly, working within a paradigm of modern social and pedagogical communications, the tutor can help the pupil to realize the interests which arise "here and now", are situational and cannot have a little deep character, however can potentially become more or less steady and therefore, significant for further life of the pupil, for his further education.

And, at last, thirdly, modern social and pedagogical communications focuses the mentor on assistance to the pupil in understanding of its problems, in understanding of their true reasons, in formation of the purposes connected with need to solve these problems.

Thus, within modern social and pedagogical communications the purpose of education of the pupil appears a product of joint efforts of the tutor and pupil.

In the educational system, the role of modern socio-educational communications teacher poses two problems. Firstly, the need to create conditions that encourage the student as a co-creator of the process of their own education based on their needs, abilities, motivations and interests. And, secondly, neutralization (prevention) and possible anti-social personality-destructive purposes. Teacher introduces some socially and personally significant limitations by providing the pupil an opportunity for free choice based on his inner world, creating the conditions for self-determination and self-realization of the child. Defining goals together with a student of his education, and ideally creating conditions to the goal he has set its own development, teacher support, assists students and pupils in the movement towards them. Model of modern social and educational communication virtually eliminates rejection pedagogical goals of the teacher student teacher as a child does not impose their goals, their understanding of its benefits, and the proceeds from his own life goals and, based on organizing education. This increases the efficiency of the educational process.

For example, pedagogical maintenance, pedagogical support and pedagogic of the helping relations being modern social and pedagogical communications are directed on helping the trainee to learn themselves, to catch the uniqueness and originality, to realize own identity, to construct the trajectory of a course of life and according to it an education trajectory.

The purposes of education and training of the pupil in the context of pedagogic of support and cooperation are corrected in process of its development and a growing, its new interests and problems, requirements and abilities, change of motives of behavior, at all the accruing participation of the pupil in the organization of own education, participation which becomes more and more conscious, active and independent. In the course of education in system of modern social and pedagogical communications the teacher and the pupil (student) appear equal subjects, co-creators of educational process.

Modern social and pedagogical communications essentially resist to traditional pedagogical stereotypes. The pedagogical help (as the principle, a position and technology of modern pedagogical communication) assumes absolutely other pedagogic (student teaching and the theory) in which everything is opposed to influence pedagogic. The support pedagogic, maintenance pedagogic, cooperation pedagogic, pedagogic of the helping relations is shown in work of enthusiasts of humane, free education now. It is not simple "it is focused on the trainee", it all depends on him and is defined by him. It allows to speak about its other communicative pedagogical culture.

Modern social and pedagogical communication - this is real understanding of communication, which in contrast to the impact of communication can effectively solve the problem of changes in personality traits and student and adult, since they are both flexibly change their behavior and work together to build a space of cooperation, which was not in pedagogy exposures that put a purely superficial socializing purpose. Modern social and pedagogical communication - communication is a deep communion, where there are not a teacher and student, not the teacher and the pupil, and two different people (small and large), who have something to say to each other. The essence of deep communication is not so much to ask a student to guide him self the question as to stimulate the student's philosophical reflection on the situation, reinforce reflection, in which he takes on his new "I", and change their views.

At such approach the pupil becomes the original subject of own development, from its inner world, its potential, interests and problems the purpose of its education and means of its achievement depends. The pupil turns from means of achievement of the educational and educational purposes of the mentor that, in essence, is set by paradigms of pedagogic of authority and pedagogic of manipulation, in the educational purpose of own development supported by the mentor.

It is possible to tell with confidence that if educational activities of teachers and tutors for creation of psychology and pedagogical conditions of development of the personality on the basis of modern social and pedagogical communications will be based by the principle: the theoretical and practice-focused studying of educators of modern social and pedagogical communications, a reflection by pupils of their subject experience, maintenance by purposeful monitoring of a state and development of pupils, modern social and pedagogical communications in an education system will be introduced at the high level, providing achievement of good results in training of specialists in the sphere of any professions, system work on education of workers of all education system in the field of humanistic pedagogic and new modern psychology and pedagogical technologies of the innovative direction of development of the educational organization is necessary.

Now, during an era of modernization and global changes of modern society there is a question of assistance of the highest educational institutions in the solution of the questions and tasks facing mankind. Often we prepare qualified personnel in hope that they will become the bulletin of the new decisions conducting to achievement of results in this or that sphere of our life. Not without reason, graduates become experts of new generation. It tells about continuous self-improvement, development, self-knowledge not only itself, but also the society.

Platforms and the international educational institutions and programs giving new prospects and opportunities for higher educational institutions in the solution of global questions of mankind open new integration potential in the international educational space.¹

Representation of today's youth, namely pupils of schools, students of colleges, higher education institutions and workers of an education system meanwhile is a little known of a role of social and pedagogical communications. And therefore, studying of new methods of communications in training, their role and the importance becomes important and demands close attention in modern educational space.

According to the Movement of the United Nations concerning education, sciences and cultures (UNESCO) "Education for all" sets before itself the internationally agreed targets in the fields of education directed on satisfaction of need for training of all children, youth and adults by 2015:

"Ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programs".²

References

Rassulova S.K., World educational space: perspectives and horizons. SSRN: <http://ssrn.com/abstract=2583522>.
<http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/efa-goals/>
 Education for All Global Monitoring Report (GMR) "Education for All 2000-2015: Achievements and Challenges," 9 April in New Delhi (India), at UNESCO's Paris Headquarters and at the United Nations in New York.

¹ Rassulova S.K., Мировое образовательное пространство: перспективы и горизонты (World educational space: perspectives and horizons) SSRN: <http://ssrn.com/abstract=2583522>.

² <http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/efa-goals/>

The Use Of Field Activities In Geology Teaching Conceptions And Representations Of Practices Of Portuguese Teachers

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ABSTRACT

Field activities are valuable geology teaching resources. However, their effective educational value depends on the way teachers use them which in turn depends on teachers' conceptions. This research focused on comparing how 102 low secondary school teachers and 131 secondary school teachers deal with field activities in geology teaching. The results show that, opposite to what happens in the secondary school, the majority of low secondary school teachers do not use field activities. The majority of field activities users promote less than four activities per year and most of them do not seem to have an appropriate understanding of how field activities should be used to become a valuable educational resource. Besides, teachers do not trust too much students' ability to play an active role as learners, as they argue for teacher centred activities, based on the idea that students are not able to carry out the activity or that it is teachers' responsibility to undertake it. However, the majority of field activities users feel satisfied or even completely satisfied with the way they have been dealing with field activities. This means that teachers' conceptions and practices need to be improved.

INTRODUCTION

Science is about the natural world. Its main objective is to fully understand nature in order to attain the ultimate goal of controlling and also benefitting from it. Therefore, every citizen living in modern scientific and technological advanced societies should have a level of understanding of science that enables him/her to understand and use scientific knowledge in everyday contexts. Hence, it has been argued that whatever the school level, science teaching should give a meaningful contribution to developing students' scientific literacy (DeBoer, 2000; Liu, 2010). This requires science teaching to convey students an understanding of some basics science concepts and a mastery of some methods and technics so that they can not only appreciate the way science knowledge is developed but also use it in their everyday personal, societal and professional lives, namely to solve real socio-scientific problems. To succeed in doing so, science teaching must not neglect developing students reasoning (Liu, 2010) and metacognitive abilities (Veenman, 2012; Thomas, 2012), so that students can decide when, what and how they can use science knowledge in those contexts and for those purposes.

It has been argued (Dillon, 2011) that teaching science outside the classroom may help students to become aware of the usefulness of science knowledge. As far as geology teaching is concerned, teaching outside the classroom is necessary also because the main geological processes can hardly be reproduced in the lab to be studied because they take a too long time to occur and have very large dimensions which are incompatible with the limited space of the laboratory (Alvarez-Suárez, 2003). Therefore, there is a good consensus among science educators and science teachers that engaging students in field activities may be a good way of getting students acquainted with real geological phenomena and to foster a contextualized and meaningful learning about them. However, the way field activities are structured and used is the key factor that may enable to or impair from reaching these goals. This is the main reason why this paper focuses on the use of field activities for geology teaching.

Due to some proliferation of terms, it seems necessary to clarify the meaning of three central concepts of this research: field work, field activities, and field trips. Following a previous conceptual discussion on this issue (Dourado & Leite, 2013), in this paper we assume that fieldwork is a single entity that encompasses the whole set of field activities that a student can do outside the classroom. As far as field activities are concerned, they have to do with a diversity of tasks that are carried out outside the classroom: where the events to be studied take place; where the natural phenomena happen and can be observed as they happen, without the need of being reproduced; or in real work contexts, where technology is used for industry and production purposes. In addition, and as it was pointed out in a previous paper (Dourado & Leite, 2013), if one wants students to be involved into field activities, a field trip has to be planned and organized and it can include the performance of one or more field activities within the scope of one or more school subjects.

Having students doing fieldwork requires a previous preparation of the field trip. As a matter of fact, taking students out of school requires deciding on the scope and destiny of the field trip, setting up a set of administrative procedures (related, for example, to funding and transportation), and obtaining parents' permission for their children to take the trip. However, it is worth noting that doing fieldwork does not

necessarily require a long trip (Del Carmen, 1999), as some school surroundings may be rich enough to be worth being studied with the advantage of increasing the probability of making learning more meaningful for students, due to the geographical proximity of the place or phenomena that are studied.

Field trips may lead to simultaneous attainment of several learning outcomes, depending on the way they are organized, on the characteristics of the field activities to be undertaken, and on the way they are performed. As summarized in a previous paper (Dourado & Leite, 2013), those broad learning outcomes can be synthesised as follows:

- “conceptual learning, that is objectives that focus on strengthening previously acquired conceptual knowledge, constructing ‘new’ conceptual knowledge, or reconstructing students’ conceptual knowledge (which is especially interesting when students hold alternative conceptions on the concepts to be studied within the scope of the field trip);
- procedural learning, that is knowledge of specific purposes observation techniques (e.g., birds needing), samples collection (e.g., water from a river), conservation and transportation of materials (e.g., plants or animals) that need to be mastered by students;
- epistemological learning, that is knowledge relative to the characteristics of the scientific methodology relevant in field contexts, as well as to the (un)certainly of the science explanation and to the nature and role of models in (physics, chemistry, biology and geology) knowledge development;
- attitudes development, namely those related to respect towards the environment and towards science as well as scientific attitudes;
- interpersonal relationships, which have to do with respect to others, and cooperation with colleagues;
- contact with nature and real contexts, aiming at making students’ aware of the complexity of the real world and the interactions that it comprises;
- questioning abilities, that is asking questions about nature and work contexts to understand, improve and take profit from them;
- extrinsic motivation, that has to do with fostering students’ interest and curiosity towards real world work contexts.” (p. 1234 and 1235).

However, as it was suggested above, the learning outcomes that can be achieved through a field activity depend on the way it is structure and implemented. Thus, when planning a field trip, it is worth to start by deciding on the objectives to be attained and to select the most appropriate way of choosing and structuring the activity to be performed. According to Pedrinaci, Sequeira and García (1994), these decisions may be influenced by the teachers’ teaching perspectives but they may be facilitated by having a typology of field activities that makes it explicit how different structures may be more prone to lead to the fulfilment of some objectives than to others. Based on classifications of field activities suggested by other authors (e.g., Compiani & Carneiro, 1993; Pedrinaci, Sequeira & García, 1994), Dourado and Leite (2013) have identified and characterized seven types of field activities and made explicit the outstanding objective that students may attain through each of them. Those types of activities are: Motivating, Training, Illustrative, Guided observation, Inductive, Problem posing and Problem-solving activities. Thus, the outstanding objective ranges from affective (e.g., Motivating activities) and procedural (e.g., Training activities), to conceptual (e.g., Illustrative activities) and inquiry objectives (e.g., Inductive and Problem solving activities). Some of these types of activities should be performed before approaching the related concept (e.g., Motivating, Problem posing), others should be performed after teaching the related concepts (e.g., Illustrative) and others can be performed either during or after concept teaching (e.g., Training) and still others can be really integrated with related concept as they work as starting points for learning those concepts. In fact, this requires the use of previous knowledge (that may be further developed during the activity) but also originates new learning (e.g., Problem-solving) and promotes conceptual, and methodological knowledge integration.

Although teachers believe that fieldwork provides a number of direct benefits to student’s learning, they seldom use fieldwork (Morcillo, Rodrigo, Centeno & Compiani, 1998; Toro & Morcillo, 2011) and when they do “they use fieldwork as a means to help students understand theory, to inject reality into their teaching and to teach subject-specific skills.” (Scott, Fuller & Gaskin, 2006, p.169). In fact, fieldwork is one of the tools that can be used to put theory into context and teachers keep on seeing fieldwork as essential for engagement with the external (‘real’) world (Michie; 1998; Scott, Fuller & Gaskin, 2006). However, they seem to prefer to teach the content before performing the field activity, so that students become aware of what they are going to meet in the field (Morcillo, Rodrigo, Centeno & Compiani, 1998; Scortegagna, 2005). They believe this is important for students to take the most profit from the visit. A consequence of this is that most field activities are illustrative (Zamalloa, Maguregi, Fernández, Echevarría & Sanz, 2014) even though teachers are used to state that they would like to perform more motivating and inquiry like activities, focusing on contents different from those taught in the classes (Morcillo, Rodrigo, Centeno & Compiani, 1998; Albergaria-Almeida, Barros & Cruz, 2013).

As field activities take place outside the classroom, they require a field trip to be organized and, as this costs

time and money, it should be appropriately prepared. For this purpose, three steps need to be considered: before the field trip, during the field trip and after the field trip. With regard the first step, and whatever the main goal of the field trip, bureaucratic (including permission to take students out of school) aspects need to be dealt with by the teachers and/or the school leaders. However, there are also pedagogic issues (e.g., teaching concepts, training technics, developing observation grids, making explicit assessment criteria, etc.) that need to be considered but the appropriate way of doing it (including tasks to be carried out and ways of getting students engaged) depends on the nature of the field activities to be performed during the field trip, and it may range from no task done before it (e.g., Problem-posing) to concept teaching before the field trip (e.g., Illustrative). Advantages of making students familiar with the place to be visited needs to be analysed and eventually tackled before the field trip. The encounter with a novel place may be an advantage for some types of activities (e.g., Motivating; problem posing) but it may partly prevent learning in others (e.g., Illustrative).

During the field trip, field activities should be performed according to the type of activity chosen and the requirements it imposes to students and teachers. This means that teachers need to think carefully how they will conduct students in the field, how much guidance they will offer to them, and how much verification they will do to ascertain that students did (observed or collected or measured, etc.) what they were supposed to do.

After the field trip some well-designed tasks should be undertaken in the classroom or in the laboratory to continue, complement and/or evaluate learning that took place in the field. Students should actively participate in these tasks, so that teachers can perceive their achievements and failures related to the field activities and can help them to overcome the latter and to really take educational profit from the field trip.

Despite the existence of guidelines for field trips and field activities organization (García, 1994; López, 2008; Rebelo, Marques & Costa, 2011), when they are organized, they hardly attend to research recommendations which may put at risk the fulfilment of their intended learning outcomes. In fact, Remmena and Frøylanda (2014) studied six cases of follow-up work carried out by three teachers and their students in three upper secondary schools in Norway in order to find out whether or not it was consistent with literature guidelines. In all but one case, the implementation of such recommendations followed the literature guidelines but they concluded that students undertook low level learning processes.

Research suggests that teachers perceive field trips as highly valuable educational experiences for their students (Anderson, Kisiel & Storksdieck, 2006) and make it explicit several reasons for using field trips (Kisiel, 2005), among which are: increases students' motivation, and promotes learning (Kisiel, 2005; Viveiro & Diniz, 2009). Stokes, Magnier and Weaver (2011) even concluded that students and teachers identified similar purposes of carrying out fieldwork and emphasized that some of those purposes have to do with fragmented (non-relational) conceptions, which focus on a single piece of learning, and others concentrate on cohesive (relational) conceptions that require the development, use and integration of different types of knowledge. Zamalloa, Maguregi, Fernández, Echevarría and Sanz (2014) found that the majority of Spanish low secondary school geology teachers use pre-field activities even though these have to do with giving a lecture on the content to be approached during the visit. The option for a lecture-like pre-field trip task may be dictated by the fact that they have not ready materials that they can use to support those tasks.

Activities performed during a field trip are frequently not integrated into subsequent school-based learning, probably because teachers value and understand field trips better than post field trip activities (Anderson, Kisiel & Storksdieck, 2006). Besides, even though teachers say that they promote post field trip activities, it seems that they have different perspectives of what it should be (Kisiel, 2005) and students do not perceive that the activities they are asked to do in the classroom have some sort of relationship with the field trip (Anderson, Kisiel & Storksdieck, 2006).

When teachers try to organize a field trip they face several constraints (Anderson, Kisiel & Storksdieck, 2006; Viveiro & Diniz, 2009) that are independent of the school system and the cultural background (Anderson, Kisiel & Storksdieck, 2006). In fact, Anderson, Kisiel and Storksdieck (2006) noted that funding, lack of time allocated to field trips planning and preparation, and lack of autonomy to select venue were reported by teachers as critical obstacles to planning field trips. Viveiro and Diniz (2009) also noted that funding and lack of time together with school directive board lack of support and students (mis)behaviour and the additional responsibility that taking students for a field trip imposes on teachers are the main factors that interfere with field trips planning and reduce its frequency. Zamalloa, Maguregi, Fernández, Echevarría and Sanz (2014) found that teachers do not do field trips because they do not have time, field trips cost money, and classes have too many students. Han and Foskett (2007) encountered concerns not only about the size of the class, and safety issues, but also about the impact on other classes of taking teachers and pupils out of schools. To these authors, these constraints require considerable political work by teachers in schools to overcome them, otherwise they will offer insuperable barriers to the development of fieldwork.

OBJECTIVES

In Portugal, geology is taught in low secondary school (7th to 9th grade) as well as in secondary school (10 and 11st grade), together with biology, and also in the 12th grade, as an independent course. Besides, although a

teacher is qualified to teach geology in both school levels, schools tend to allocate teachers to a certain school level, based on the school needs and on the teachers' preferences. Also, field activities may be carried out in order to attain diverse aims, being some of them focused mainly on cognitive aspects and others on the affective ones. This means that, although teachers have the same previous background, they may use field activities with different purposes in the diverse school levels they are asked to teach.

Thus, the main goal of this research is to compare how biology and geology teachers use geology field activities in low secondary school and in secondary school science courses. The objectives of the research are to investigate: whether and why do teachers teaching geology in these two school levels use (or do not use) field activities; when are field activities performed with regard to concept teaching, in the two school levels; how satisfied teachers feel with the field activities that are carried out in the school level they are used to teach; what would be the ideal time relationship between concept teaching and field activities performance; what activities are carried out before, during and after a field trip, in the two school levels.

This research adds to the state of the art as no empirical research focusing on a comparison of the use of field activities in different school levels in known.

THE STUDY

Data were collected by means of a questionnaire developed for the purpose of this study. Taking as reference the objectives of the study, the questionnaire starts by asking teachers to provide a few personal and professional data to be used for sample characterization purposes and also to make sure that they qualify to belong to one of the groups that are under question in this paper. Afterwards, it focuses on issues like: frequency of use of field activities; reasons to use/not use field activities; relationship between time of concept teaching and field activities performance; level of satisfaction with field activities performed; activities carried out before, during and after the field trip.

The questionnaire was designed using Google Docs, it was content validated with two science education specialists and two secondary school teachers, and it was ameliorated after their suggestions. Then it was submitted to the ministry of education in order to get permission to send it to schools. As soon as this permission was obtained, data collection procedures were set up.

Thus, 303 school networks, spread all over the country, were selected and invited to participate in the study. Each selected school network Director was asked to collaborate and to choose four teachers, two of them teaching geology in low secondary school and two teaching geology in secondary school (as defined above), among his/her school network teachers with a minimum of three years of teaching experience. Afterwards, the Director would invite them to participate in the study and ask them to reply to the questionnaire which was available on-line, through a web-link given to them. Following (McMillan & Schumacher, 2010), answering to the questionnaire was assumed to be an acceptable way of showing informed consent to participate in the study. Data were got from a total of 233 Portuguese geology teachers, 102 teaching at the low secondary (LS) school level and 131 teaching at the secondary (S) school level.

Table 1 shows that both groups of participant teachers are quite similar with regard to gender, with more females as usual, but they differ with regard to age and previous teaching experience. However, as it should be expected, low secondary school teachers are younger than their secondary school counterparts. This difference is due to the fact that usually more experienced teachers are appointed by the school leaders to teach at the secondary school level, as this one is expected to be more demanding.

Table 1: Characteristics of the sample (%)

(N=233)			
Variable	Categories	Low secondary school teachers (n=102)	Secondary school teachers (n=131)
Gender	Female	81	78
	Male	19	22
Age	30 to 40 years	30	8
	31 to 50 years	53	53
	Over 50 years	17	39
Teaching experience	5 to 10 years	5	1
	11 to 20 years	61	26
	21 to 30 years	25	53
	Over 30 years	9	20
Higher academic degree	First degree	65	57
	Post-graduation	12	12
	Research master	22	30
	PhD	1	1

Whatever the group, the majority of the teachers are first degree holders only. The secondary school group includes more master holders than the low secondary school group. For what is known about the Portuguese biology and geology teachers' population, these characteristics of the sample suggest that it compares to teachers teaching geology in schools at the two school levels under question.

In the case of close questions, data analysis comprises computation of absolute and relative frequencies per category of answer, assuming each *a priori* possible answer as a category of answer. As far as open questions are concerned, content analysis was done, sets of *a posteriori* categories of answers were developed, and computation of absolute and relative frequencies per category of answer was performed.

FINDINGS

Teachers' use of field activities

Data given in table 2 show that the percentage of teachers that state that they use field activities in their classes is larger in the secondary school group (76%) than it is in the low secondary school one (48%). Most of the teachers that stated that they use field activities mentioned that they promote one to three a year. Only in the secondary school group a few teachers (8%) mentioned that they use this type of activities more than three times a year. These results are consistent with those obtained by Han and Foskett (2007), with geography teachers, Dourado (2001), with natural sciences teachers, and Rebelo and Marques (2000), with geology teachers.

Table 2: Teachers' use of field activities (%)

(N=233)

Use of field activities		School level	
		Low Secondary (n=102)	Secondary (n=131)
Do not use		52	24
Use	1 to 3 times a year	48	68
	more than 3 times a year	0	8

Teachers that do not use field activities justified this fact based on three main groups of ideas. One of them is related to field trip management. According to these teachers: field activities require students' engagement which is hard to achieve with classes that include a large number of students; the syllabuses are very long and teachers have not enough time to perform field activities; to do field activities they would need to organize a field trip which has some costs that the school cannot afford to pay. As a teacher stated, "Field visits that require transportation are very hard to organize when school has no money for that and students' families cannot pay for it" (LS59). These results are consistent with those obtained by other authors that found that teachers mention difficulties related to: the length of the syllabuses (Michie, 1998; Anderson, Kisiel & Storksdieck, 2006); the cost of the field trip (Anderson, Kisiel & Storksdieck, 2006; Viveiro & Diniz, 2009; Michie, 1998; Zamalloa, Maguregi, Fernández, Echevarría & Sanz, 2014); the large number of students per class (Zamalloa, Maguregi, Fernández, Echevarría & Sanz, 2014).

The second one is related to students themselves. According to teachers: some students are busy after school and therefore they would not be able to go for a field trip; students are not interested in science and therefore it is not worth organizing such kind of activities; some students are immature and they conceptualise field trips as being leisure moments and misbehave during the field activities. As a teacher wrote: "Students do not always behave properly; this is especially true for the younger ones." (LS59). Viveiro and Diniz (2009) also report difficulties related to students misbehaviour.

The third one has to do with teachers themselves. According to these teachers: they do not feel motivated enough to organize field trips which are activities that require a lot of preparation; they do not know enough about the geology of the school environment so that they can organize a useful field trip. In fact, a teacher stated "I feel unsecure when thinking about going out with students for a field visit as I am aware that I have not enough training to do it" (S91), and another one stated "I am not familiar with the geological pathways of the area where I have been teaching" (LS95). Research results show that teachers seldom mention difficulties related to their knowledge and/or characteristics to justify the non-performance of field activities. However, these results are consistent with those obtained by Dourado (2001), as he found that about one third of the teachers that participated in the study he undertook stated that they were not used to carry out field activities as they did not know the place that should be the venue of the field trip.

Teachers that stated that they use field activities, gave reasons for it that depend on when they introduce the field activity in the teaching sequence. Those that use the field activity before the teaching of the related concept tend to justify it based on the idea of motivating students ("Usually to motivate students integrated in a problem based learning approach" (S117)). Those that use field activities during concept introduction they tend to state that they integrate both and do it in order to foster students' conceptual learning ("[If field activities are performed]

During the teaching of the new concepts students may more easily integrate them some previous learning.” (S131)). Finally, those that use field activities after teaching the related concepts mention that they do it in order to reinforce previously acquired knowledge (“I believe that it will be more easy for the students to understand geological processes or identify rocks [in the field] if they have study the concepts in advance” (LS94)).

Concept teaching and field activities performance

Teachers that stated that they use field activities seem to introduce them at different stages with regard to the related concept teaching (table 3). Some of them stated that they use them at a single stage, but others mentioned that they use them at two or three different stages. However, on one hand, there is a slight tendency for performance of field activities after concept teaching to prevail, whatever the teachers’ group, even though these percentages are lower than those obtained by Scortegagna (2005), also with geology teachers. Those teachers believe that “Concept mastery is a previous condition for field activities to succeed.” (LS43). On the other hand, only about one third of each group stated that they use field activities at the three different stages of the teaching sequence: before, during and after concept teaching. This finding is consistent with the existence of different types of field activities that have different performance requirements so that they can lead to different learning achievements. Thus, it may mean that these teachers may have clear ideas on how to use field activities so that students can take most profit from them. One of the teachers mentioned that:

“When they are carried out before [teaching], they aim at raising students’ curiosity an motivating them to study a given topic; if they are carried out during [teaching] then they offer a complement to learning that has just been done and give room for new learning to take place; when they are performed after teaching the concepts, then they reinforce learning that has already been done.” (S110).

Table 3: Time relationship between field activities performance and concept teaching (%)
(N=149)

Field activities <i>versus</i> concept teaching	School level	
	Low Secondary (n=49)	Secondary (n=100)
Before	8	1
During	18	20
After	31	32
Before or during or after	23	21
Before or during	0	3
Before or after	10	7
During or after	10	16

The whole sample was asked about the ideal time for using field activities with regard to concept teaching if it was only up to the teachers to choose when to use them. As far as teachers that stated that they are used to use field activities are concerned, the percentage of teachers that would like to use this type of activities during concept teaching (table 4) almost doubled, in both school levels, when compared with the percentage given in table 3. This means that there are more field activities users’ that value the use of field activities during concept teaching than those that use them in such way. This difference was not observed by Morcillo, Rodrigo, Centeno and Compiani (1998) that obtained similar percentages for the two cases. In addition, and opposite to what Morcillo, Rodrigo, Centeno and Compiani (1998) have concluded, the latter field activities users seem to practice field activities after teaching (table 3) more than they would like to (Table 4).

Table 4: Ideal time relationship between field activities performance and concept teaching (%)
(N=233)

Field activities <i>versus</i> concept teaching	Field activities users		Field activities non-users	
	Low Secondary (n=49)	Secondary (n=100)	Low Secondary (n=53)	Secondary (n=31)
Before	8	6	8	13
During	35	36	24	32
After	19	15	38	29
Before or during or after	16	26	13	13
Before or during	8	5	2	3
Before or after	6	5	9	3
During or after	8	7	6	7

Besides, the percentages of field activities non users that would like to use field activities during concept teaching are a bit smaller than those obtained for field activities users. In addition, the percentages of field activities non-users that stated that they would use field activities after teaching the concepts are almost the double of those obtained for the field activities users. These results suggest that in the non-user group there are larger percentages of teachers acknowledging inductive ideas than in the user group.

The percentages of teachers that mentioned that they use (users) or would like to use (non-users) field activities before teaching are very limited. As far as the users group is concerned, this result is surprising because it inconsistent with results obtained by Morcillo, Rodrigo, Centeno and Compiani (1998). In fact, these authors found that the percentage of teachers that practice field activities before teaching is higher than that of teacher that would like to use field activities at that same stage.

Field activities users' level of satisfaction

Most of the teachers feel satisfied or completely satisfied with the field activities that they have been performing, whatever the school level (table 5).

Table 5: Field activities users' level of satisfaction with field activities performance (%)
(N=149)

Level of Satisfaction	School level	
	Low Secondary (n=49)	Secondary (n=100)
Completely satisfied	33	35
Satisfied	43	46
Moderately satisfied	24	18
Fairly satisfied	0	1
Unsatisfied	0	0

This would be a good result if teachers had reported that they use field activities often and if they were using them appropriately. As findings reported above suggest that this may not be the case, this high level of satisfaction among both groups of teachers is a cause for some concern because if teachers feel satisfied with their inadequate practices, they are not to be expected to feel the need to change them and consequently they would not be expected to look for either advice or training on how to improve their practices with regard to field activities use.

Field trip associated pedagogic activities

Several pedagogic activities may be carried out before, during and after a field trip. Field activities users were asked about whether or not they promote pedagogic activities in each one of these steps. All of them stated that they do it. However, some of the activities they put forwards are teacher centred and seem to be related to teacher class preparation activities rather than activities targeted to students (table 6). This is the case of activities design and/or planning that is the item mentioned by the largest percentage of teachers. Other activities are formulated from a teacher's point of view, as it is the case of concept teaching and problem presentation (which are tasks that the teacher is supposed to do). There is also an activity (Definition of assessment criteria) that was classified as teacher centred because it is usual to have teachers deciding on assessment criteria even though this sort of decisions should involve students too. However, it is not completely clear that it is a student's centred activity, as it may be illustrated by the following answer: "Elaboration of the evaluation process" (S126). As a matter of fact, this answer does not clearly show who is involved in the elaboration mentioned.

Table 6: Activities carried out before the field trip (%)

(N=149)

Responsible person	Activities	Low Secondary (n=49)	Secondary (n=100)
Teacher	Activities design and/or planning	14	50
	Problem presentation	6	1
	Concept teaching	18	15
	Definition of assessment criteria	6	7
Students participation	Knowledge about the place to visit including to its geology	27	21
	Definition of methodologies to be followed in the field	49	38
	Definition of safety rules	6	6
	Training of relevant skills	2	8

Some other activities are formulated by teachers in such a way that one can infer that students are involved into them. Those mentioned by the largest percentages of teachers focus on methodologies to be followed in the field and on knowing the place to visit, including its geology. In fact, one of the teachers mentioned that he/she does activities aiming to "select and convey to students the goals of the activity; to prepare the field visit worksheet, together with students" (LS41) and another one mentioned that he/she wants "to make students familiar with the geology of the place to be visited." (S28). Participants in the study carried out by Zamalloa, Maguregi, Fernández, Echevarría and Sanz (2014) also reported that they prepare the field trip either by giving a sort of lecture on the theme or by showing a video, probably to make students familiar with the place to visit.

As far as activities carried out in the field are concerned, table 7 shows that teachers selected activities centred in the students as well as activities centred in themselves. With regard to the former, figures suggest that the percentages of teachers that selected the diverse levels of frequency of performance of each type of activity that can be carried out in the field are quite similar for the two school levels. However, the majority of teachers, of both groups, stated that students are asked to "Collect samples" and "Do measurements" in a few activities only. In addition, low secondary school teachers seem to ask students to Identify Problems in fewer activities than their counterparts do. In fact, 55% of the low secondary school teachers *versus* 44% of the secondary school teachers stated that they ask students to do it in none or in few activities. This may mean that teachers either conceptualise this task as less appropriate for younger than for older students or may feel that younger students are unable to perform it. As teachers stated: "I have been teaching in low secondary school: it is fully necessary to guide students in the activities they are asked to do" (LS76); "Students need to be guided and there are some contents that must be explained in the field because they are not able to discover them." (S48).

With regard to teacher centred activities, low secondary school teachers seem to give guidance, to explain and to ask question to students within the scope of fewer activities than their secondary school counterparts do. On the opposite, and as it should be expected, secondary school teachers tend to observe students in more activities than their low secondary school counterparts do. This may mean that secondary schools teachers have their students working in the field more autonomously than their low secondary school counterparts do. Besides, it may mean that there are several different causes for it, including the way they see students. As a teacher stated: "Depending on students' autonomy, I may allow them to carry out the activities on their own or not. However, I think that it is important to observe them and to ask questions to them in order to promote learning." (S74).

Table 7: Activities carried out in the field (%)

(N=149)

Responsible person	Activities	Proportion of field activities							
		None		A few		Most		All	
		LS	S	LS	S	LS	S	LS	S
Students	Carry out observations	0	0	0	6	22	12	78	82
	Identify Problems	0	1	55	43	45	41	0	15
	Collect samples	2	7	59	55	31	31	8	7
	Do measurements	2	7	59	65	31	24	8	4
	Make drawings/schemes	0	3	33	38	51	37	16	22
	Make photographs	0	1	0	10	33	25	67	64
Teachers	Guide students	0	1	0	17	31	27	69	55
	Explain to students	0	2	12	22	23	21	65	55
	Ask questions to students	0	1	6	16	20	21	74	62
	Observe students	0	1	2	4	22	10	76	85

Note: LS = Low Secondary school (49 teachers); S = Secondary school (100 teachers)

There are a few differences between the two groups of teachers, with regard to the activities performed after the field trip (table 8).

Table 8: Activities carried out after the field trip (%)

(N=149)

Responsible person	Activities	Proportion of field activities							
		None		A few		Most		All	
		LS	S	LS	S	LS	S	LS	S
Student	Report preparation	18	1	2	26	41	28	39	45
	Discussion on the activities	0	0	0	4	84	16	16	80
	Planning of new activities	49	38	33	51	4	8	14	3
	Problem-solving	47	4	4	53	16	31	33	12
Teacher	Teach new knowledge on activity	37	15	16	49	18	21	29	15
	Reinforce knowledge on the activities	14	1	2	17	57	30	27	52

Note: LS = Low Secondary school (49 teachers); S = Secondary school (100 teachers)

In fact, the percentages of low secondary school teachers that do not ask students to write a report, to do problem-solving and to plan new follow-up activities for the activities performed are higher than the corresponding secondary school ones. Anyway, teachers in both groups seem to believe that students are not skilled enough to plan activities, as they state: “Designing new activities is not always an easy task for this grade level (7th grade)” (LS80); “Planning is teachers’ responsibility” (S62). Teachers believe that reports are useful tools for learning and assessment. Therefore, they put forwards justifications including ideas like these: “Writing a report [...] is useful to consolidate learning carried out during a field trip” (LS26) and “As far as reports are appropriately supervised, so that plagiarism is prevented, they are very important for the teacher to assess student’ understanding of the field activity.” (S9).

Besides, discussion of the activities carried out in the field seems to be the most popular student centred post field trip activity among both groups of teachers. Also, the majority of both groups seem to use knowledge reinforcement activities very often, that is in association with most or all field activities performed. To justify that, they argue that post field trip activities are useful “To remember, to consolidate, and to bridge theory and practice and to gain some feedback on the activities performed” (LS5) and “To consolidate acquired knowledge or competences” (S20). Finally, secondary school teachers seem to teach field activity related knowledge a bit more rarely than low secondary school counterparts do.

CONCLUSIONS AND IMPLICATIONS

It is commonly accepted that field activities may have high educational value. However, their real learning outcomes depend on the way they are structured and implemented. The results of this study show that, opposite to what happens in the secondary school, the majority of low secondary school teachers do not use field activities. Besides, the majority of field activities users promote less than four activities per year. In addition, most of them do not seem to have an appropriate understanding of how field activities should be used to become a valuable educational resource. This statement is based on the fact that the reasons they put forwards to justify the relationship between concept teaching and activity performance are not underlined by arguments showing neither an awareness of the diversity of types of field activities nor the necessary match between the learning objective to be attained and the structure of the activity to be performed. Besides, teachers do not trust too much students’ ability to play an active role as learners, as they argue for teacher centred activities based either on the idea that students are not able to carry out the activity or on the belief that undertaking it is teachers’ responsibility. Bearing in mind these results, the fact that the majority of teachers feel satisfied or even completely satisfied with the way they have been dealing with field activities is a striking issue. This suggests that teachers are not conscious about the inconsistencies of their practices with the state of the art regarding the use of field activities in science teaching. A consequence of this is that geology teachers’ practices need to be improved. However, changing teachers’ conceptions on the issue of using field activities for teaching geology seems to be a necessary condition for teachers’ practices to become more consistent with research results on the topic. As a matter of fact, as teachers seem to value teacher centred approaches, students’ engagement with field activities (that would lead them to develop in an integrated way practical, theoretical and reasoning competencies) is at risk. This means that in-service courses on the issue of this paper should be organized but they cannot focus on field activities related issues only. Rather, they should start with a discussion on the cognitive and affective aspects of the learning process so that teachers change the way they look at students’ cognitive abilities and learn how to trust their learning competencies. Empirical information from student centred or active methods should be used to provide evidence of what students are able to do when they have the opportunity to play a central role in the learning process. Afterwards, an epistemological discussion to help teachers to overcome some myths about science (McComas, 2002) and to make it clear that there is a complex interplay between theory and practice (Leach, 1999) should be held. This would be important to argue against a single type of field activities as well as against a single way of relating theory and field activities. Finally, and based on this and other research results, it seems necessary to make teachers become aware not only of the types of tasks that can be performed before and after the field activities (Lopez, 2008; Rebelo, Marques & Costa, 2011) but also of the way they may fit with different the types of field activities (Dourado & Leite, 2013). The pre field tasks should prepare students for the field activity but they cannot provide information that negatively interferes with the desired students’ engagement with the field activity (which, of course, depends on the type of activity). With regard to post field (follow-up) tasks, those that seem to be more neglected by teachers (Remmen & Frøyland, 2015) and researchers, it seems necessary to find out ways of making them to become an added value for students. This may require working from both tasks and learning that took place in the field and going a step further in a direction that may depend on what was done in the field as well as on the content and the school level that are at stake. In any case, decisions on hands-on, minds-on and hearts-on need to be balanced against the learning targets so that carrying out field activities can become an added value to science education in general and Geology education in particular.

References

- Albergaria-Almeida, P., Barros, J., & Cruz, N. (2013). Conceções e práticas de professores de geologia sobre trabalho de campo. *Enseñanza de las Ciencias, n° extra*, 47-53. Available at: http://congres.manners.es/congres_ciencia/gestio/creacioCD/cd/articulos/art_850.pdf
- Alvarez-Suárez, R. (2003). La utilización de modelos experimentales en geología. *Alambique: Didáctica de las Ciencias Experimentales*, 35, 60-69.
- Anderson, D., Kisiel, J., & Storksdieck, K. (2006). Understanding teachers' perspectives on field trips: discovering common ground in three countries. *Curator: The Museum Journal*, 49 (3), 365-386.
- Compiani, M., & Carneiro, C. (1993). Os papéis didáticos das excursões geológicas. *Enseñanza de las Ciencias de la Tierra*, 1 (2), 90-98.
- DeBoer, G. (2000). Scientific literacy: another look at its historical and contemporary meanings and its relationship to science education reform. *Journal of Research in Science Teaching*, 37 (6), 582-601.
- Del Carmen, L. (1999) El estudio de los ecosistemas. *Alambique: Didáctica de las Ciencias Experimentales*, 20, 47-54.
- Dillon, M. (2011). Teaching science outside the classroom. In R. Toplis (Ed) *How science works* (p.134-147). London: Routledge.
- Dourado, L. (2001). *O trabalho prático no ensino das ciências naturais: situação actual e implementação de propostas inovadoras para o trabalho laboratorial e o trabalho de campo*. (Unpublished doctoral thesis), University of Minho, Braga, Portugal.
- Dourado, L., & Leite, L. (2013). Field activities, science education and problem-solving. *Procedia - Social and Behavioral Sciences*, 106, 1232 – 1241. Available at www.sciencedirect.com.
- García, E. (1994). Metodología y secuenciación de las actividades didácticas de geología de campo. *Enseñanza de las Ciencias de la Tierra*, 2 (2), 340-353.
- Han, L., & Foskett, N. (2007). Objectives and constraints in geographical fieldwork: teachers' attitudes and perspectives in senior high schools in Taiwan. *International Research in Geographical and Environmental Education*, 16 (1), 5-20.
- Kisiel, J. (2005). Understanding elementary teacher motivations for science fieldtrips. *Science Education*, 89 (6), 936-955.
- Leach, J. (1999). Students' understanding of the co-ordination of theory and evidence in science. *International Journal of Science Education*, 21 (8), 789-806.
- Liu, X. (2010). Beyond science literacy: science and the public. *International Journal of Environmental & Science Education*, 4 (3), 301-311.
- López, J. (2008). Las salidas de campo: mucho más que una excursión. *Educación en el 2000*, 11, 100-103.
- McMillan, J., & Schumacher, S. (2010). *Research in education: a conceptual introduction*. 5th Ed. Boston: Pearson.
- Michie, M. (1998). Factors influencing secondary science teachers to organise and conduct field trips. *Australian Science Teacher's Journal*, 44 (4), 43-50.
- Morcillo, J., Rodrigo, M., Centeno, J., & Compiani, M. (1998). Caracterización de las prácticas de campo: justificación y primeros resultados de una encuesta al profesorado. *Enseñanza de las Ciencias de la Tierra*, 6 (3), 242-250.
- Pedrinaci, E., Sequeiros, E., & García, E. (1994). El trabajo de campo y el aprendizaje de la geología. *Alambique: Didácticas de las Ciências Experimentales*, 16 (1), 17-20.
- Rebelo, D., & Marques, L. (2000). *O trabalho de campo em geociências na formação dos professores: situação exemplificativa para o Cabo Mondego*. Aveiro: University of Aveiro.
- Rebelo, D., Marques, L., & Costa, N. (2011). Actividades en ambientes exteriores al aula en la educación en ciencias: contribuciones para su operatividad. *Enseñanza de las Ciencias de la Tierra*, 19 (1), 15-25.
- Remmen, K., & Frøyland, M. (2015). What happens in classrooms after earth science fieldwork? Supporting student learning processes during follow-up activities. *International Research in Geographical and Environmental Education*, 24 (1), 24-42.
- Scortegagna, A. (2005). Trabalhos de campo nas disciplinas de geologia introdutória: cursos de geografia no estado do Paraná. *RA'EGA, O Espaço Geográfico em Análise*, 9, 37-46.
- Scott, I., Fuller, I., & Gaskin, S. (2006). Life without fieldwork: some lecturers' perceptions of geography and environmental science fieldwork. *Journal of Geography in Higher Education*, 30 (1), 161-171.
- Stokes, A., Magnier, K., & Weaver, R. (2011). What is the use of fieldwork? Conceptions of students and staff in geography and geology. *Journal of Geography in Higher Education*, 35 (1), 121-141.
- Thomas, G. (2012). Metacognition in science education: past, present and future considerations. In B. Fraser, K. Tobin, & C. McRobbie (Eds) *Second International Handbook of Science Education* (p. 131-144). Dordrecht: Springer.
- Toro, R., & Morcillo, J. (2011). Las actividades de campo en educación secundaria. Un estudio comparativo entre Dinamarca y España. *Enseñanza de las Ciencias de la Tierra*, 19 (1), 39-47.

Veenman, M. (2012). Metacognition in science education: definitions, constituents, and their intricate relation with cognition. In A. Zohar, & Y. Dori (Eds) *Metacognition in Science Education* (p. 21-36). Dordrecht: Springer.

Viveiro, A., & Diniz, R. (2009). As atividades de campo no ensino de ciências. In R. Nardi (Org) *Ensino de ciências e matemática, I: temas sobre a formação de professores* (p. 27-42). São Paulo: Cultura Acadêmica.

Zamalloa, T., Maguregi, G., Fernández, M., Echevarría, I., & Sanz, J. (2014). Acercar la geodiversidad através de las salidas de campo en la ESO. Una investigación con el profesorado de ciencias de Bizkaia. *Enseñanza de las Ciencias*, 32 (3), 443-467.

The Use Of Old Computer And Peripheral Ads (1970-1990) In Teaching Computer Technologies And Foreign Languages

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ABSTRACT

This paper aims to investigate the potential of printed computer advertisements (between 1970 and 1990) in the development of communicative and written competence in English language along with teaching computer technologies. The research was conducted with 179 printed computer advertisements and the data was taken by the help of Abbyy Finereader and NoteTab software. The different words they contain were counted and grouped under the parts of speech. Findings have been compared to the same word count analysis conducted to French as a foreign language course book. The results show that the advertisements examined are very rich sources by means of linguistics and they can be employed in foreign language teaching classes as support material. At the same time, they can be used in technology classes as they contain chronological data.

Keywords: Advertisement, foreign, language, teaching computer, technology

INTRODUCTION

Derived from the Latin word “ad vertere”, which means to turn toward, advertisement may not be considered as a new concept. Bhatia, (2000) claims that Egyptians used papyrus to make sales messages and wall posters. Commercial messages and political campaign displays have been found in the ruins of Pompeii and ancient Arabia. Lost and found advertising on papyrus was common in Ancient Greece and Ancient Rome.

Advertisements have changed form and objective when we were introduced to mass media. In 21st century, they are not just a tool of persuading potential customers to buy a product or service but also creating awareness or giving information about the products or service. According to James F. Kelly, advertising keeps a business's name in customers' minds, drives growth, builds the brand and has the potential to increase revenue.

Cook, (1992) states that advertisements is a communication tool in almost all the modern communities. It is estimated that an average individual in the British communities watches 150.000 ads until the age of 35, and this is equal to 75.000 minutes or, in other words, 2 months. These kinds of statistics can be considered to be sufficient to show that ads are powerful and appealing communication tools. This linguistically rich combination of texts, pictures and metaphors is among the important authentic materials in teaching foreign languages. Kress & van Leeuwen (2006) states that visual structures as well as linguistic structures signify a certain interpretation and social interaction while mentioning the existence of visual codes and visual linguistics. The linguistic density of ads is higher than any other systems of written communication since they are required to deliver many messages within a limited time period.

Kress and van Leeuwen (1996 cited by Najafian and Dabaghi, 2011) introduce the existence of a visual code or grammar of visual design. They believe that both visual structures and verbal structures can be used to express meanings drawn from common cultural sources. Like linguistic structures, visual structures point to particular interpretations of experience and forms of social interactions.

Photographs, used in print advertisements, work as a system of signs that gives form and meaning to consciousness and reality. There are always two modes of communication in a printed advertisement; a verbal mode and a visual one, and which interact together. These two modes can be expressed through the different signs utilized like colors, typed words, and photographs. The more these signs used effectively, the more powerful the language become. (Najafian and Dabaghi, 2011, cited by Abdelnal & Sase, 2014).

It is obvious that the recent studies on foreign language acquisition strategies focus on reinforcing learning by increasingly revealing the individual differences among students (Littlemore, 2001). In this regard, although there are many ways to separate the students such as age, gender, motivation, type of learning, the practices concentrated on revealing these through visual and metaphorical intelligence are particularly emphasized.

Informatics or foreign language as well as the use of visual materials are not new to the field of education and Pit Corder distinguished between the terms ‘speaking about pictures’ and ‘speaking with pictures’ with distinct examples. He preferred to use the picture for the language rather than use the language for the picture as in the classical approach. He supports the use of pictures to feature the language proficiency through questions such as ‘Are you afraid of heights? or Have you ever been to the Eiffel Tower?’ rather than a student holding a picture of the Eiffel Tower and forming classical and descriptive sentences such as ‘This is the Eiffel Tower. It is located in Paris etc’ (Wright, 1989). Mishan regards printed, audial and/or visual advertisements which provide visual and cognitive advantages depending on the statistical structure of the picture as authentic materials involving sociological and pragmatic language variety.

THE STUDY

In this quantitative study, 179 randomly chosen printed computer and peripherals advertisements were used as data sources then the scanned forms of these advertisements were processed thorough optical character recognition. (OCR) To establish the best quality output, industry leader Ocr software, like Abbyy Finereader, were employed in this stage of data collection. After the scanned images of advertisements has been transformed to text files, they have been processed in NoteTab software to find out the number of different words used in advertisement along with the number of total words and characters with their occurrence frequencies. For parts of the speech analysis Open Xerox Service has been used.

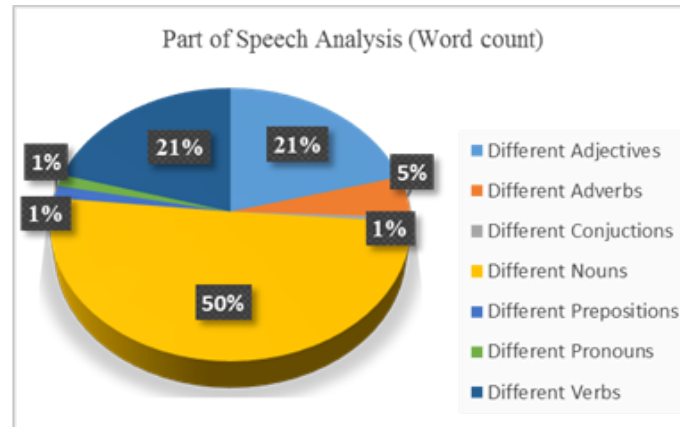
All of the advertisements chosen were suitable to be used as support materials in computer technology teaching classrooms as they share key information of their era. They may serve as good examples in the classroom especially in teaching computer history or chronology of a specific computer peripheral. Moreover, advertisements enable the students to observe how much the speed and ways of production have changed over the years as they offer extra information such as price, specifications, and areas of use.

FINDINGS

It is now obvious that natural language processing tools and automatically extracting linguistic information from a corpus text are very important elements of computational linguistics. In the past, part of speech tagging or word category disambiguation had to be done manually and that was a huge manual labor. Owing to improvements in software technology and powerful hardware of new computers, today it became a matter of seconds to gather the results from the part of speech tagging software.

Table 1 Word counts and their occurrence rates for the advertisements.

Part of speech	Count	Occurrence	Frequency %
Different Adjectives	501	1725	17,266
Different Adverbs	117	578	5,785
Different Conjunctions	15	533	5,335
Different Nouns	1215	4015	40,186
Different Prepositions	36	1044	10,449
Different Pronouns	33	250	2,502
Different Verbs	495	1846	18,477
TOTAL	2412	9991	100



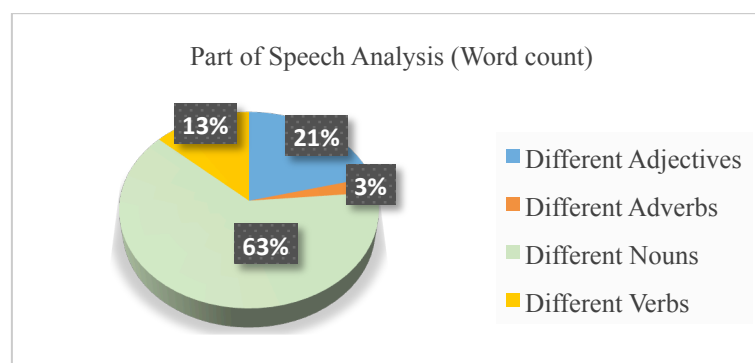
Graph 1 Graphic representation of parts of speech.

Table 1 and Graph 1 above show the word counts and their occurrence rates for the advertisements. It is found that 2412 of 9991 words included in advertisements were different from one another, thus the rate of unique words to the total is 24 % which can be accepted as high in terms of richness of a text. 50% of these unique words were found to be nouns, 21% were adjectives, 5% were adverbs, and the rate of prepositions were also 21%. One the counting and tagging completed, we then jump to search for the technical terms related only to computer and information technologies in the established wordlist.

Total of 233 unique words, which corresponds approximately 10% of the total words counted, were listed. 13% of these words were verbs, 21% were adjectives, 3% were adverbs and 63% were unique nouns.

Part of speech	Count	Occurrence	Frequency
Different Adjectives	49	163	16,684
Different Adverbs	6	9	0,921
Different Nouns	147	678	69,396
Different Verbs	31	127	12,999
TOTAL	233	977	100

Table 2 Word counts and their occurrence rates for computer and peripherals related technical terms



Graph 2 Graphic representation of part of speech

CONCLUSION

Since the advertisements are meant to express ideas and convince the target audience with as few words as possible, they are very rich patterns in terms of linguistics. They aim to include short and attention raising words which need to be easily kept in mind, so they contain a great deal of metaphors.

In this study, it is found out that the number of the different word items in the advertisements analyzed is higher than the word items in an old regular French course book. Moreover, each and every word item included in the

advertisements is selected thoroughly after a meticulous process to have a great impact on the target audience. The linguistic richness is also provided by avoiding the repetition to be able to create a text lightweight in size but large in meaning.

According to The Common European Framework of Reference for Languages, teaching a foreign language is not limited to course books, methods or other materials specially designed to be used in the classroom. Thus, the use of authentic materials is highly encouraged. In this regard, advertisements are rich authentic materials not only in terms of linguistics but also in terms of culture. This study shows that they can be used as support materials in foreign language learning classes when organizing writing and speaking activities. On the other hand, as the number of the unique words in advertisements is very high, in our study it was 2412, they can also be employed in vocabulary teaching activities.

About 10% of the unique words in different categories of the advertisements used in our study were technical terms related to computer and peripherals which can support technology teaching in schools. The advertisements also provide a chronological and historical perspective that the students may compare with today's technological improvements.

This study reveals that, either in foreign language or technology teaching, the old printed advertisements still represent huge support resources.

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The Use of Old Computer and Peripheral Ads (1970-1990) In Teaching Computer Technologies and Foreign Languages

References

- Bhatia (2000). Advertising in Rural India: Language, Marketing Communication, and Consumerism, 62-68.
- Cook, G. (1992). The Discourse Of Advertising. London: Routledge, 5.
- Kelly, J. (2010, August 26). Traditional Advertising: Why Companies Need It ?-Forbes Retrieved from [www.forbes.com: http://www.forbes.com/2010/08/26/advertising-social-media-old-spice-ibm-commercials-brand-loyalty-cmo-network.html](http://www.forbes.com/2010/08/26/advertising-social-media-old-spice-ibm-commercials-brand-loyalty-cmo-network.html)
- Kress, G., & van Leeuwen, T. (2006). Reading Images, the Grammar of Visual Design. London: Routledge.
- Kress, G & van Leeuwen, T. (1996). Reading Images, the Grammar of Visual Design. London: Routledge, 2.
- Littlemore, J. (2001). Metaphoric intelligence and foreign language learning. Humanising Language Teaching.
- Najafian, M., & Dabaghi, A. (2011). Hidden Language of Advertising: A Semiotic Approach. arts.kmutt.ac.th, 20-26.
- Wright, A. (1989). Pictures for Language Learning. Cambridge: Cambridge University Press.

Towards An Open Access Institutional Repository For Learning Objects: The University Of Colima Experience

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ABSTRACT

This paper presents an institutional proposal for the developing of a learning objects repository, based on the open access model. This repository will be a place for storage of the educational materials produced by academics and researches of the University of Colima in Mexico.

Interoperability is one of the main issues in creating a learning objects repository; our project will work holistic with the other educational software platforms of our institution, as the libraries system (SIABUC) and the distance education platform (EDUC). In addition, the learning objects on the repository will be standardized in order to use them on courses with external Learning Management Systems (LMS).

Keywords:

INTRODUCTION

In this document, part of the experience of building a repository for learning objects (LO) in the University of Colima is explained. The objective of the repository is to encourage the usage of learning objects by teachers and students of high school and higher education in our institution. With this, it seeks to strengthen the involvement of Information Technology and Communication in the process of teaching and learning by establishing a broader number of alternatives through the potential of learning objects as didactic support.

A learning object can be defined as “a pedagogical mediator that has been intentionally design for a learning purpose and serves actors in various educational modalities” (Nuevas formas de enseñar y aprender; Ministerio de Educación Nacional, s/f), besides, it can be considered that this objects are constituted as a “digital or non-digital entity that can be used, re-used or referred for the learning supported on technology” (Callejas, Hernández, & Pinzón, 2011).

With the goal of optimization the reutilization of learning objects it is necessary to count with a space “destined for its storage and classification to facilitate later maintenance, localization and, possibly, sharing the LO with other systems in diverse applications” (López, 2005), the space that fulfills this objective is known as a repository of learning objects.

METHODOLOGY

The results presented are derived of a progressive work that contributed to clarify the general characteristics, as well as the procedure to follow for the elaboration of learning objects that considers the characteristics of our institution.

Some of the moments that were part of the definition of such procedure were: the documental review of the concept of learning objects, several repositories (national and international) of learning objects and the analysis of processes and procedures in order to design the specific process for designing and making LO.

National repositories were reviewed: Technological Institute of Sonora (Instituto Tecnológico de Sonora, s/f), the Center of Resources for Teaching and Learning (CREA for its acronym in Spanish) of the Center of Economical Administrative Sciences of the University of Guadalajara (Universidad de Guadalajara, s/f); the institutional repository of the Network of Digital Collections of the National Autonomous University of Mexico

(UNAM, s/f). In the international level we considered: Bdigital, institutional repository of the National University of Colombia (UNAL, s/f); the Bank of Learning Objects and Information of the University of Antioquia (UDEA, s/f); also the Multimedia Educational Resource for Learning and Online Teaching (MERLOT, s/f) and finally AGREGA2 (Agrega, s/f).

The analysis of processes and procedures implied the review of a certified process and specific to the sub process of Design and Development of Educational Solutions Based on IT, in function on the participation of key actors that intervene in the development of learning objects.

FINDINGS

In order to define the appropriate procedure for the design and development of learning objects, an exercise in integration of procedures was performed.

In order to develop this repository we are working with the General Direction of Educational Resources at the University of Colima, they have an ISO-9001 certified process in the Management of Information Technology and Communication, in the sub process of Design and Development of Educational Solutions Based on IT, so it was decided to consider the requirements of this sub process and integrate the needs arising from the design, construction and evaluation of learning objects to a new process.

The certified sub process considers three key actors:

- a) The client,
- b) The responsible for customer service and,
- c) The personal dedicated to design and development.

Nevertheless, as part of the proposal for the elaboration of learning objects in our institution, it was considered necessary the definition of the participation of teachers, educational counselors and advisers of the General Coordination of Teaching that would be involved in the development of learning objects. At this new design, these actors have specific functions:

- **Teachers:** With the teacher begins the development of learning objects, as this is the person making the request to register a new learning object, also is responsible of the didactical design that will support the learning object. An essential task for the teacher is the development of thematic content because he is who holds the domain of his discipline.
- **Pedagogical Advisor:** The pedagogical advisor plays an support role in the didactical design of the object, he is responsible for reviewing, giving feedback and approving the didactical design of the learning object; therefore it belongs to him the first contact with the professor interested in the design of a new object.
- **Academic Advisor:** The academic advisor has two specific functions. First, he checks that the didactical design complies with the established requirements, he is also who makes the application to the General Direction of Educational Resources to start the development of the object corresponding to the technological dimension.
- **General Direction of Educational Resources:** Once the teacher, pedagogical advisor and CGD advisor have worked in the pedagogical dimension, the General Direction of Educational Resources is the responsible of the technological development which implies the development of the application, verification of prototype, evaluation of the teacher's satisfaction with the learning object, publication of the object, and finally, perform the monitoring and evaluation of the learning object.

In Figure 1 can be observed the defined procedure, considering the requirements of the certified sub process and the new needs related to the elaboration of the learning objects.

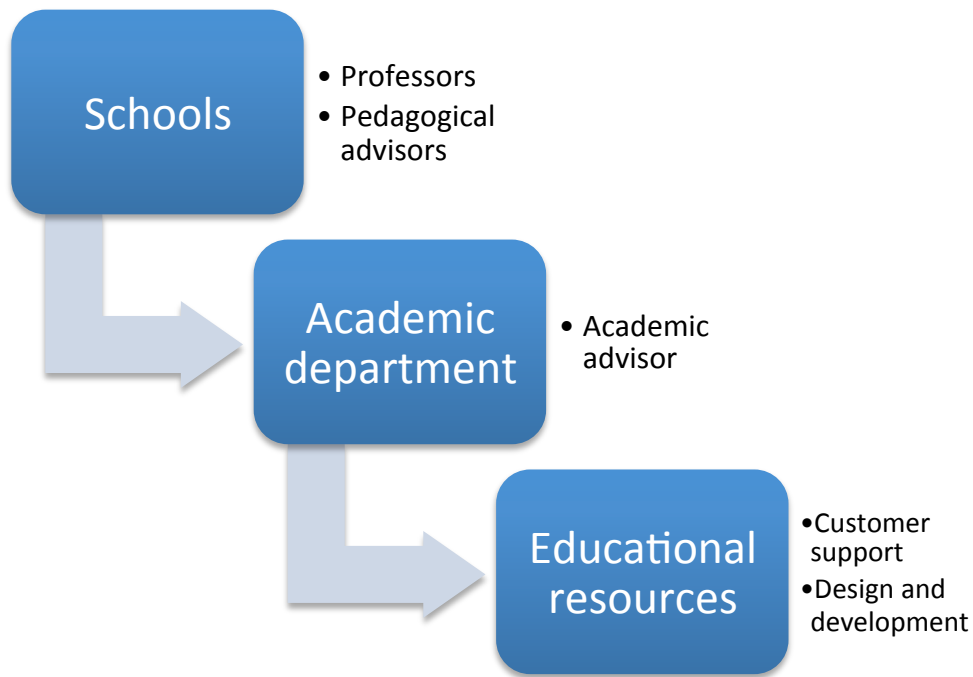


Figure 1: Flow for the development of a learning object.

By defining the above procedure, we seek to have multiple revisions of the learning object, prior to publication: first, by the pedagogical advisor, with emphasis on the didactical design; the second, by the CGD advisor, that will verify that all the requested elements have been considered for the development of the object; thirdly, the design and development team will verify the object as well as support the validation made by the teacher. This scheme is proposed to strengthen the quality of the learning objects that will be published in the institutional repository.

DISCUSSION

The University of Colima aware of the importance of learning objects in the teaching-learning process has developed through different stages of time, projects of this nature (Galeana, 2003), (Farias, Cruz, Ceja, Diaz, & Macias, 2006) and (Enríquez, 2006). Besides of a number of developments to automate various teaching processes, the most important are the libraries system (SIABUC) and the distance education platform (EDUC). Our repository will work holistic with those software platforms, because the interoperability is one of the main objectives in creating our learning objects repository. In addition, the learning objects on the repository will be standardized in order to use them on courses with external Learning Management Systems (LMS).

To this end, cataloging and packaging standards are fundamental in the process of assembly and distribution of existing instructional resources. The most representative in the field of e-Learning are the IEEE-LOM standard and the ADL-SCORM specification.

The IEEE-LOM (Learning Object Metadata) standard (IEEE, 2002) defines the syntax and semantics of Learning Object Metadata, which facilitates classification. It consists of over sixty descriptors grouped in a conceptual scheme of nine categories: general, life cycle, metadata, technical, educational, rights, relation, annotation and classification.

The ADL-SCORM (ADL, 2004) specification uses the IEEE-LOM standard for describing learning resources. It provides oriented guidelines interoperability between different e-Learning solutions. It consists of content packaging standards in order to create hierarchical structures that are interchangeable. Defines a protocol for communication between the user and a LMS, like one for the record of the actions performed by the user.

CONCLUSIONS

This paper presents the proposed establishment of an institutional repository of learning objects for the University of Colima, a platform that considers a group of interrelated services for the management of Learning Objects, from platforms with instructional resources of the institution.

References

- Callejas, M., Hernández, E. J., & Pinzón, J. N. (2011). Objetos de aprendizaje, un estado del arte. *Entramado*, 7 (1), 176-189.
- López, C. (2005). Los Repositorios de Objetos de Aprendizaje como soporte a un entorno e-learning. Universidad de Salamanca. Salamanca, España: Universidad de Salamanca.
- ADL. (2004). Sharable Content Object Reference Model. ADL SCORM Specification.
- Agrega. (s/f). *Agrega 2*. Retrieved from <http://www.agrega2.es/web/>
- Enríquez, L. (2006). Objetos de aprendizaje; hacia la conformación de una red de repositorios. CUDI.
- Farias, N., Cruz, G., Ceja, O., Diaz, M., & Macias, J. (2006). Toward an Agent-Based Platform for Learning Objects Management. In T. Böhme, V. M. Larios, H. Unger, & H. Unger, *Innovative Internet Community Systems* (pp. 111-119). Berlin: Springer.
- Galeana, L. (2003). La Plataforma de Gestión de objetos de aprendizaje . XII Encuentro Internacional de Educación a Distancia. Guadalajara.
- IEEE. (2002). Standard for Learning Object Metadata. IEEE Standard.
- Instituto Tecnológico de Sonora. (s/f). Repositorio de Objetos de Aprendizaje. Retrieved from <http://biblioteca.itson.mx/oa/principal.htm>
- MERLOT. (s/f). Multimedia Education Resource for Learning and Online Teaching (MERLOT II). Retrieved from <http://www.merlot.org/merlot/index.htm>
- Ministerio de Educación Nacional. (s/f). Nuevas formas de enseñar y aprender. Retrieved from Colombia aprende: http://www.colombiaprende.edu.co/html/directivos/1598/article-88892.html#h2_1
- UDEA. (s/f). Banco de Objetos de Aprendizaje y de Información. Retrieved from <http://aprendeonline.udea.edu.co/ova/>
- UNAL. (s/f). Bdigital. Retrieved from <http://www.bdigital.unal.edu.co>
- UNAM. (s/f). Network of Digital Collections. Retrieved from <http://www.rad.unam.mx>
- Universidad de Guadalajara. (s/f). Centro de Recursos para la Enseñanza y el Aprendizaje. Retrieved from <http://www.crea.udg.mx/>

Typical Use Of Ict By Pupils In Basic Schools In The Czech Republic – Results Of A Cluster Analysis

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ABSTRACT

The paper describes the results of a research study investigating whether Czech pupils in grade eight in basic schools can be divided into several typical groups according to their use of ICT. The pupils were presented with a questionnaire, in which they responded on a four point scale to 35 statements relating to their use of ICT. The research study was conducted in May 2015 and involved a total of 229 pupils from grade eight from six basic schools of various focus (sports, alternative, common) and various sizes in the Moravian region. The data were subsequently analysed using a cluster analysis. It was anticipated that Czech pupils could be divided into two typical groups, i.e. ‘digital natives’ and ‘digital immigrants’. The analysis indicated that Czech pupils have a tendency to be arranged in two typical groups according to their use of ICT, which is consistent with the research assumption.

INTRODUCTION

Recently, there has been an increasing discussion about the necessary changes in the way of educating pupils not only in basic schools. Various approaches of the young generation to information resources and information technology are defined; from an external perspective, these approaches result in changed teaching practices and habits. In order to ensure effective education of pupils, we need to be able to precisely determine the way they work with information and information technology in the context of acquiring new knowledge.

THE STUDY - DIGITAL NATIVES AND IMMIGRANTS

At the beginning of the 21st century, Marc Prensky (2001a, b) started to speak about a generation of digital natives. These are children who have been under the influence of ICT since they were born and who have no problems with working and moving in a virtual environment. As a result of the fact that these children were born in an era full of digital technologies that surround them and that they have used ever since their early childhood, they think and process information in a different way than previous “analogue” generations. These differences in the approach to information are much greater and more significant than most parents and teachers think. Digital natives expect an immediate and direct contact with technologies and people. They are in contact with technologies all the time and prefer text communication to voice communication. According to Prensky, the generation of digital natives is no longer motivated by the traditional form of learning based on text content. Digital natives can also be classified as persons who have been raised in an environment rich in modern technologies since their childhood. These include computers, digital music players, camcorders, webcams, mobile phones, etc. The main difference between these generations is the divergence of thinking and information processing. Digital natives are accustomed to receiving information very quickly, prefer parallel activities and multi-tasking, prefer graphical interpretation to text, game to “serious” work, network cooperation, random access to information (hypertext). They expect immediate praise and frequent appreciation of their work. They do not consider the computer, mobile phone, internet, etc. as modern technologies but as an integral part of their lives.

On the other hand, digital immigrants form a generation of users who were not raised surrounded by digital technologies, acquired their ICT skills through learning in adulthood, do not consider these technologies a natural everyday phenomenon, to which they would adapt not only their learning strategies but also their way of thinking and receiving information. This generation is characterized by persisting fears of modern technologies; they do not search for these technologies unless they are forced to by the circumstances and their ways of receiving information and thinking remain in traditional models such as e.g. linear reading. They prefer text-based information and traditional methods of communication to multimedia, use the internet as a secondary source of information (the primary source is a printed form), study manuals (instructions) to use a programme instead of intuitive trying, print out email communication and documents, ask via a phone if the addressee actually received an email, etc. Digital immigrants do not use the same possibilities and methods of work as digital natives. They do not believe that digital natives can learn something while they watch TV or listen to music because this used to be different when they were younger.

A similar attitude to the issue was presented by J. S. Brown (2000), who defined four basic theoretical dimensions and identifiers describing the group of digital immigrants. One of the features of the network generation is an ability to perform multitasking intuitively and effectively, i.e. cope with several activities at once. The other three characteristics are formed by a complex of related cognitive abilities.

This domain is also addressed by a number of Czech authors. However, all published results relate to university students; no research studies aimed at basic and secondary school students have been published so far. In his research sample of adult respondents, Zounek (2006) identified two groups of computer users, i.e. “computer literates” and “computer illiterates”. The author analysed both groups by means of several personal and social-economic characteristics of the respondents in order to reveal significant determinants of the digital gap in the context of the monitored groups of adults. Some determinants proved to be very significant (age, place of residence, educational degree, level of ICT skills, economic position), while others subsided (gender differences). In the final part of the research the author investigates the attitudes of “computer literates” and “computer illiterates” to informal education. The results suggest that the digital gap between the two groups will likely have a deepening tendency. It is also possible to state that the determinant of the digital gap in the Czech Republic will be represented not only by achieved educational degree but also by participation in informal education.

Klement, Chráska (2012) believe that education in the form of e-learning, which uses ICT as much as possible, might present a suitable space for the verification of some characteristics of the generation of digital natives. According to the findings there is a group of students who clearly refuse to study through e-learning, although it uses hypertext educational materials and on-line environments. This group surely includes students born after 1990, who should presumably be in the group of digital natives. Although this fact can be caused by a number of other factors, the question is whether the generation of students born after 1990 (this corresponds with global introduction of ICT in the Czech Republic) really prefer just on-line educational activities. This research study did not clearly prove or disprove the existence of a group of digital natives.

In 2011 a research study was carried out at the Faculty of Education, Palacky University (Marešová, 2012). The objective of this survey was to find out in what ways current university students who are in the group of digital natives accept new learning strategies using digital media. The results of the research confirmed the hypothesis that, based on their experience with ICT, students from the group of digital natives would succeed in accomplishing tasks in a virtual environment. However, students still prefer traditional teaching methods (textbook, presentation, blackboard) to electronic teaching. Similar conclusions detected Chráska (2014a)

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RESEARCH METHOD

The research method was based on an own questionnaire, in which the respondents expressed their agreement with 35 statements (declarations). These statements were used to classify pupils into two groups (digital natives and immigrants). The pupils expressed their degree of agreement with the statements using the following scale: I completely disagree (response coded as 1), I rather disagree (coded as 2), I rather agree (coded as 3), I completely agree (coded as 4).

We also investigated other pupil characteristics typical for these groups, who in particular taught pupils the following skills: Communicate over the internet, Develop documents for school, Change computer setting,

Find out information about an unknown topic, Assess the credibility of information on the internet, Set a computer network (e.g. home computer network). The following options were provided: Myself, Teachers, Family, Friends, I cannot do this.

RESEARCH SAMPLE

The research study was conducted in May 2015 and involved a total of 229 pupils from grade eight from six basic schools of various focus (sports, alternative, common) and various sizes in the Moravian region. The age of the pupils was 14-15 years. The structure of the research sample is shown in Table 1. For further processing of the research by means of a cluster analysis we only used data from pupils who completed the entire questionnaire – the number of these pupils was 184 – see the following analysis.

RESULT PROCESSING METHOD

The data were analysed by means of a generalized cluster analysis (Chráska, 2015). This method is suitable for processing the results of educational research studies, in which data are retrieved also by means of nominal measurement. The traditional cluster analysis requires just metric data.

DATA PROCESSING METHOD

The data acquired by means of the questionnaire were transformed into the STATISTICA 12 programme. The responses of all pupils to each questionnaire item were subject to a generalized cluster analysis. During the first stage (see Table 2) the statistical programme analysed an optimum number of clusters, i.e. two. It was therefore obvious that the initial assumption (that the pupils could be divided into two distinct groups) was correct, and it

was possible to continue with a more detailed analysis of both identified clusters. Hence, we calculated the differences in the questionnaire responses for other research variables in pupils from both clusters (see Table 3). This table shows the prevailing responses to the questionnaire items by pupils from both clusters as well as their percentages.

In order to well interpret the results, we produced Graph 1 according to the responses to the scale questions for both clusters.

Table 1: Structure of the research sample of pupils.

Summary Frequency Table (Questionnaire_2015_ZS)			
Marked cells have counts > 10			
(Marginal summaries are not marked)			
Type of basic schools	Gender b	Gender g	Row Totals
rural	9	22	31
rural	15	28	43
alternative	8	1	9
large town	22	13	35
sports	27	36	63
small town	29	19	48
All Grps	110	119	229

Table 2: Determination of the number of identifiable clusters.

Summary for k-means clustering (Questionnaire_2015_ZS)	
Number of clusters: 2	
Total number of training cases: 184	
Algorithm	k-Means
Distance method	Euclidean distances
Initial centers	Maximize initial distance
MD casewise deletion	Yes
Cross-validation	No
Testing sample	0
Training cases	184
Training error	2,436162
Number of clusters	2

Table 3: Characteristics of identified groups of pupils according to their responses to individual parts of the questionnaire.

Statement/ Question	Statement (S) or question (Q)	Cluster 1	Cluster 2	Signific.
S1	I watch TV while I write my homework.	1.86	2.11	0.09
S2	Information and communication technology is an integral part of my life.	2.79	3.18	<0.01
S3	I only read news headings on the internet and in the newspapers.	2.10	2.20	0.53
S4	I better understand graphical information (animations, figures) than text.	2.51	2.92	<0.01
S5	The speed of obtaining information is of great importance.	2.91	2.96	0.68
S6	When I learn for a test at home, I like to listen to the radio (watch TV, use Facebook).	2.15	2.59	0.01
S7	When I read text (in the newspapers, books, on the internet), I often skip to more interesting passages of the text.	2.51	2.85	0.04
S8	I like to learn by games although it takes more time.	2.66	2.94	0.06
S9	I would not do without the internet, mobile phone or computer.	2.83	3.03	0.19
S10	I prefer to watch or listen to a piece of information (from somebody else) rather than read it.	2.30	2.56	0.07
S11	I request an immediate response (praise, comment, discussion) from the teacher, friends or parents to what I do.	2.52	2.61	0.49
S12	I prefer to create something or think something up in school rather than listen to the teacher.	2.62	2.82	0.17
S13	I always use a computer to develop my materials, presentations and seminar papers.	3.14	3.52	<0.01
S14	I communicate with my friends mainly on the internet.	2.61	3.01	<0.01
S15	I expect a praise when something turns out well.	2.78	2.77	0.95
S16	I like to make my own opinion about other people, information resources, web pages, companies according other people's assessment.	2.06	2.34	0.03
S17	I always use the internet to obtain materials for presentations and seminar papers.	3.31	3.49	0.09
S18	I like to engage in discussions using chat platforms (social networks, discussion fora).	2.74	3.04	0.03
S19	I assess web pages according to other internet users.	1.80	2.05	0.04
S20	When I learn about a new piece of information (concept), I always check its validity.	2.66	2.81	0.25
S21	I like to try out new applications and technologies without reading the instruction manuals.	2.66	3.43	<0.01
S22	I consult my friends on the internet when I solve a problem.	2.75	2.90	0.33
S23	When I learn about a new concept (piece of information), I think about its link to real life.	2.67	2.65	0.89
S24	I believe in every piece of information I find on the internet.	1.49	1.63	0.18
S25	I prefer somebody to explain a new technology or application to me rather than read the instruction manual.	2.72	2.90	0.22
S26	I like to share my opinions and feelings on the internet (social networks, blogs, etc.)	2.02	2.01	0.93
S27	It does not matter to me where I find a specific piece of information – the information is what matters.	2.67	2.72	0.68
S28	I like to share with others the information I created or obtained.	2.90	2.68	0.10
S29	I download applications from unverified sources.	1.84	2.38	<0.01
S30	I am able to assess the credibility of information on the internet.	2.41	2.75	0.01

S31	If I receive a suspicious email instructing me to open an attachment or insert a password, I follow the instructions in the email.		1.76	1.75	0.97
S32	<i>I use programmes to protect my computer (mobile phone, tablet) – antivirus, firewall, etc.</i>		3.22	3.57	<i>0.01</i>
S33	<i>It is very important for me to work with a computer.</i>		2.69	3.19	<i><0.01</i>
S34	<i>I know much more about computers than most people of my age.</i>		1.66	2.61	<i><0.01</i>
S35	<i>I know much more about computers than most people older than me.</i>		1.79	2.65	<i><0.01</i>
Gender	<i>Gender (g=girls, b=boys)</i>		g	b	<i><0.01</i>
Q1	Who in particular taught pupils the following skills:	<i>Communicate over the internet.</i>	Myself	Myself	<i>0.02</i>
Q2		<i>Develop documents for school.</i>	Teachers	Myself	<i><0.01</i>
Q3		<i>Change computer setting.</i>	Family	Myself	<i><0.01</i>
Q4		Find out information about an unknown topic.	Myself	Myself	0.14
Q5		<i>Assess the credibility of information on the internet.</i>	Myself	Myself	<i>0.02</i>
Q6		<i>Set a computer network (e.g. home computer network).</i>	I cannot do this	Myself	<i><0.01</i>
Number of cases			87	97	
Percentage (%)			47.28	52.72	

Note

Statistically significant differences between the responses of pupils in both identified groups were observed in 16 statements in five additional questions and in the distribution of pupils by gender – shown in bold and italics in the table (calculated significance $p < 0.05$). In most remaining statements we also found differences in pupils' responses; however, these differences were not statistically significant.

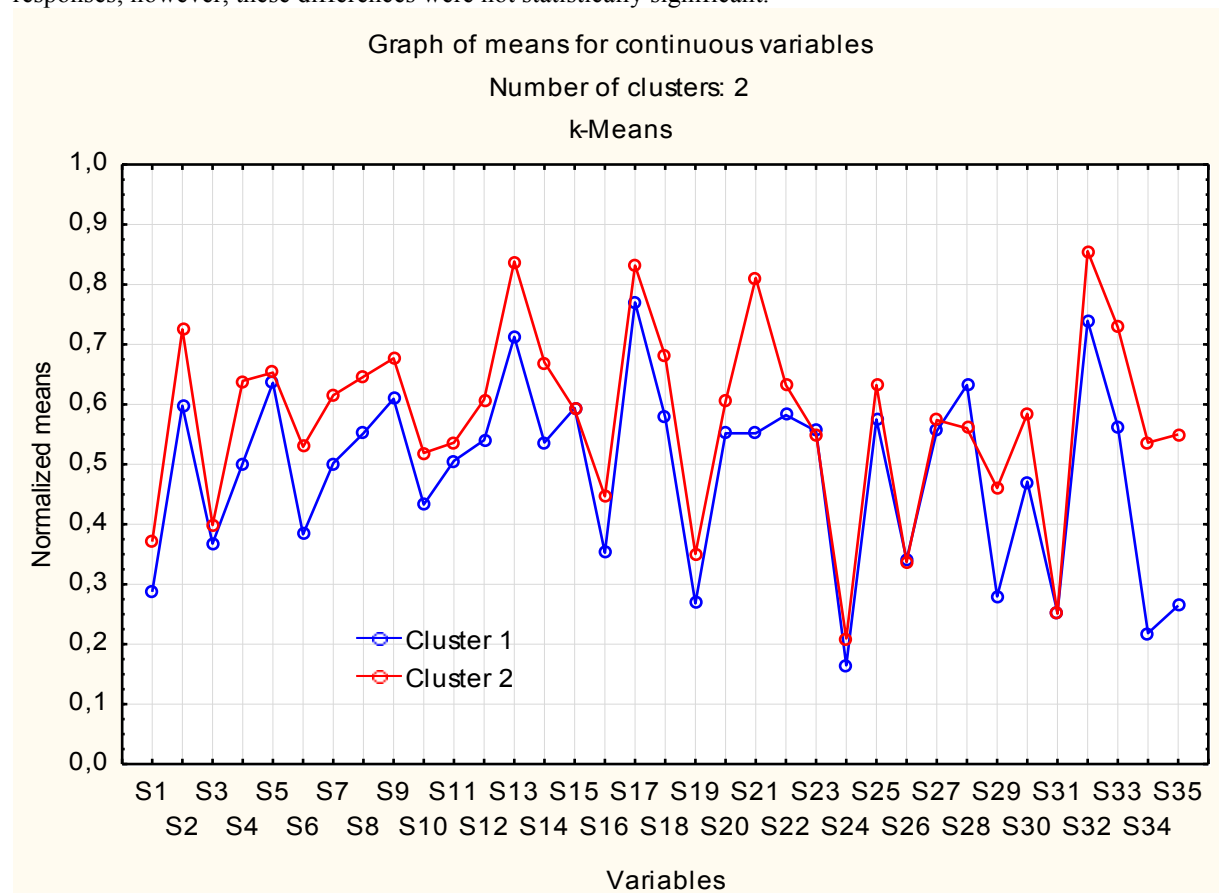


Figure 1: Characteristics of the identified groups of pupils according to their degree of agreement with individual statements – scale items in the questionnaire

Table 4 shows a comparison of the significance of the differences in pupils' responses in both identified clusters – questions containing nominal data. Tables 5-11 show the frequencies individual pupils' responses to these questions.

Table 4: Chi-square test of independence for nominal questionnaire variables for the two identified clusters of pupils.

	Independence test for categorical variables (Questionnaire_2015_ZS)				
	Number of clusters: 2 Total number of training cases: 184				
	df	Chi-square	p value	G-square	p value
Communicate over the internet	4	10,71595	0,029949	11,56273	0,020917
Develop documents for school	4	37,96810	0,000000	39,61623	0,000000
Change computer setting	4	88,92149	0,000000	99,54787	0,000000
Find out information about an unknown topic	3	5,40218	0,144608	5,43339	0,142677
Assess the credibility of information on the internet	4	11,03040	0,026224	11,18170	0,024596
Set a computer network (e.g. home computer network)	4	80,81360	0,000000	92,75834	0,000000
Gender b/g	1	55,26616	0,000000	58,71742	0,000000

Table 5: Characteristics of identified groups of pupils according to their responses to the question who taught them the following: Communicate over the internet.

	Frequency table for categorical variable: Communicate over the internet		
	Number of clusters: 2 Total number of training cases: 184		
	Cluster 1	Cluster 2	Total
Myself	52	78	130
Teachers	1	0	1
Family	11	5	16
Friends	22	14	36
I cannot do this	1	0	1

Table 6: Characteristics of identified groups of pupils according to their responses to the question who taught them the following: Develop documents for school.

	Frequency table for categorical variable: Develop documents for school		
	Number of clusters: 2 Total number of training cases: 184		
	Cluster 1	Cluster 2	Total
Myself	18	62	80
Teachers	41	18	59
Family	22	10	32
Friends	4	6	10
I cannot do this	2	1	3

Table 7: Characteristics of identified groups of pupils according to their responses to the question who taught them the following: Change computer setting.

	Frequency table for categorical variable: Change computer setting Number of clusters: 2 Total number of training cases: 184		
	Cluster 1	Cluster 2	Total
Myself	10	76	86
Teachers	12	2	14
Family	35	6	41
Friends	12	10	22
I cannot do this	18	3	21

Table 8: Characteristics of identified groups of pupils according to their responses to the question who taught them the following: Find out information about an unknown topic.

	Frequency table for categorical variable: Find out information about an unknown topic Number of clusters: 2 Total number of training cases: 184		
	Cluster 1	Cluster 2	Total
Myself	45	65	110
Teachers	16	9	25
Family	15	12	27
Friends	11	11	22

Table 9: Characteristics of identified groups of pupils according to their responses to the question who taught them the following: Assess the credibility of information on the internet.

	Frequency table for categorical variable: Assess the credibility of information on the internet Number of clusters: 2 Total number of training cases: 184		
	Cluster 1	Cluster 2	Total
Myself	30	51	81
Teachers	5	9	14
Family	21	14	35
Friends	15	16	31
I cannot do this	16	7	23

Table 10: Characteristics of identified groups of pupils according to their responses to the question who taught them the following: Set a computer network (e.g. home computer network).

	Frequency table for categorical variable: Set a computer network (e.g. home computer network) Number of clusters: 2 Total number of training cases: 184		
	Cluster 1	Cluster 2	Total
Myself	6	55	61
Teachers	0	1	1
Family	20	21	41
Friends	7	14	21
I cannot do this	54	6	60

Table 11: Characteristics of identified groups of pupils according to their gender.

Frequency table for categorical variable: Gender b/g (Questionnaire_2015_ZS)			
Number of clusters: 2			
Total number of training cases: 184			
	Cluster 1	Cluster 2	Total
boys	16	71	87
girls	71	26	97

Table 3 shows the significantly different qualities ($p < 0.05$) of pupils between the two clusters. These qualities correspond with the characteristics of the anticipated groups of digital natives and immigrants. However, an interesting finding is that none of the groups of pupils (cluster 1, 2) significantly differs in the following theoretically defined characteristics. The characteristics are more or less identical for both groups of pupils.

- 3. I only read news headings on the internet and in the newspapers.
- 5. The speed of obtaining information is of great importance.
- 11. I request an immediate response (praise, comment, discussion) from the teacher, friends, parents to what I do.
- 15. I expect a praise when something turns out well.
- 23. When I learn about a new concept (piece of information), I think about its link to real life.
- 26. I like to share my opinions and feelings in the internet (social networks, blogs, etc.)
- 27. It does not matter to me where I find a specific piece of information - the information is what matters.
- 31. If I receive a suspicious email requiring to open an attachment or insert a password, I follow the instructions in the email.

CONCLUSIONS

According to a generalized cluster analysis of the responses of pupils in grade eight of basic schools in the Czech Republic to the questionnaire items, two typical pupil clusters were identified.

Cluster 1: comprises approximately 47% of pupils, who correspond with the anticipated type of “digital immigrants”. The cluster is dominated by girls. A typical feature of pupils’ responses in this cluster (apart from differences in agreement with individual statements) is that they cannot set a computer network, teachers taught them to make documents for school, and family members taught them to change computer settings.

Cluster 2: comprises approximately 53% of pupils, who correspond with the anticipated type of “digital natives”. The cluster is dominated by boys. A typical feature of pupil’s responses in this cluster is that they learned all PC and network activities themselves.

It has been empirically confirmed that Czech pupils in the second grade of basic schools can be divided into the two theoretically discussed groups according to their use of information technology.

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References

- Brown, J.S. (2000). Growing Up Digital: How the Web Changes Work, Education, and the Ways People Learn. *USDLA Journal* [online], Vol. 16, No. 2. http://www.johnseelybrown.com/Growing_up_digital.pdf
- Chráška, M. (2014a). Approaches of University Student to Traditional and Electronic Study Materials – Results of Cluster Analysis. In *Educational Technologies in the Information - and Knowledge-Based Society. XXVI. DIDMATTECH 2013*. Gyor: TRIBUN EU.
- Chráška, M. (2014b). An analysis of typical learning styles of primary school pupils using the VARK questionnaire. *Edukacja Technika-Informatyka. Wybrane problemy edukacji technicznej i zawodowej*. Vol. 5, No. 1, pp. 63-68.
- Chráška, M. (2015). *Vícerozměrné statistické metody a jejich využití při zpracování výzkumných dat*. Olomouc: Univerzita Palackého v Olomouci.
- Klement, M., Chráška, M., Dostál, J., Marešová, H. (2012). *E-learning: elektronické studijní opory a jejich hodnocení*. Olomouc: Agentura GEVAK.
- Klement, M. & Chráška, M. (2012). Typologie studentů dle zájmu o vzdělávání realizované formou e-learningu aneb: je e-learning vhodný pro každého? *Journal of Technology and Information Education*. 2/2012, Volume 4, Issue 2.
- Marešová, H. (2012). *Vzdělávání v multiuživatelském virtuálním prostředí*. Olomouc: Univerzita Palackého

v Olomouci.

- Prensky, M. (2001a). Digital Natives, Digital Immigrants. On the horizon [online]. Vol. 9, No. 5. <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>
- Prensky, M. (2001b). Digital Natives, Digital Immigrants, Part II: Do They Really Think Differently? On the Horizon [online]. Vol. 9, No. 6. <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part2.pdf>
- Prensky, M. (2009). Homo Sapiens Digital: From Digital Immigrants and Digital Natives to Digital Wisdom. *Innovate* [online]. Vol. 5, Iss. 3. http://www.innovateonline.info/pdf/vol5_issue3/H._Sapiens_Digital-From_Digital_Immigrants_and_Digital_Natives_to_Digital_Wisdom.pdf
- Tapscot, Don. (1999). *Growing up digital: the rise of the Net generation*. New York: McGraw-Hill.
- Zounek, J. (2006). ICT, digitální propast a vzdělávání dospělých: socioekonomické a vzdělávací aspekty digitální propasti v České republice. *Studia Paedagogica*, Brno: Masarykova univerzita, pp. 101-118.

University Students' Expectations And Perceptions Of Study Abroad – Case Studies In Administrative Sciences

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ABSTRACT

The study is part of a research project on student mobility in a Mexican public university in the northeast of the country and presents here results of undergraduate students of Public Accounting, International Business and Information Technology. The study shows emotions that students experienced during and after their stay at an European university, influencing their cultural awareness, self-directing learning and personal development. With qualitative approach takes context in the contributions by students, obtained through interviews and written reports. The work contributes to rethink training processes, where curriculum support is included to promote intercultural competence in the preparation of students before going abroad.

INTRODUCTION

Often the effectiveness of mobility programs is measured by the number of outgoing students or the number of successfully completed subjects. But who asks in the sending faculty actually to the personal learning outcomes, the emotional stress situations and the personal enrichment by going abroad? Are those emotions that allow or prevent self-directed learning in an intercultural context and can determine the success or otherwise of a stay abroad. An overview of the available literature shows that the most important effects of mobility programs on people can be identified in the comprehensive development of the personality and language skills and intercultural sensitivity of the participants. From an individual perspective, the study abroad is an opportunity for learning, covering the development of the intercultural experience, sensitivity towards one's own and the other culture, language skills, vision of the world changes and wide, and reflection and cultural awareness increases, plus a greater appreciation of their own culture was detected (De Wit, 2005; Didou Aupetit, 2010; Gacel-Avila, 2012). The present work is part of a complex study lasting three years. Therefore it includes only the data related to undergraduate students in public accounting, international business and information technology and their experiences in European universities. This work is based on a brief conceptual review of literature on the importance of emotions for learning and tries to explore the relationship of emotions experienced with intercultural learning.

THE STUDY

Participants in a mobility program are located in a cultural space, where their interactions and modes of communication away from a familiar environment and tread uncharted territory. "Every step of my worldview is based on a given stock of past experience, both times my own immediate experiences and the experiences that are transmitted to me from my peers and especially my parents, teachers, and so on" (Schütz; Luckmann, 2003, p. 33). Qualitative research of these approaches are based on theoretical thoughts, where the description of the world of life help in understanding what is taken for granted culturally forms and strategies of action, to recognize structures and patterns of reproduction social (Flick, 2000, p. 106).

Concepts of intercultural and self-directed learning

In term of M. J. Bennett intercultural learning is: "Acquiring increased awareness of subjective cultural context (world view), including one's own, and developing greater ability to interact sensitively and competently across cultural contexts as both an immediate and long-term effect of exchange" (Bennett, 2009, p. 2).

It is the consciousness that also allows self-directed learning. This concept is in educational speeches from the seventies of the last century with very different definitions. For purposes of defining term study focuses on MS Knowles. The author proposes that self-directed learning is defined as: "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating their learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (Knowles, 1975, p. 18). The concept shows an upper part on self-determination and self-control. It is based on the assumption that the learner determines the learning process target, time, place, content, methods and support. Both concepts require awareness and motivation of its actors to perform in a particular cultural context. It is here, in a foreign context, where the student with an independent self-concept uses his skills acquired, where applicable strategies learned autonomously. This requires that the participant in an exchange program has self-confidence, self-assurance, self-respect and self-acceptance, positive self-esteem and affective component, to deals with situations in unfamiliar areas. What moves or stops the human being are his motives and emotions. Those forces that move the person develop implicitly and not in the same way for everyone, but depend on the experiences in a stimulating and reinforcing environment. The

stimulating experiences a positive influence on the willingness and ability to learn (Arnold, 2005, p. 1; Siecke, 2007, p. 40).

The cognitive adjustments in participants in mobility programs abroad it is reported by J. Mestenhauser (Mestenhauser, 1998, pp. 3-7). The author lists 13 specific cognitive settings: ability to recognize differences; understanding the differences between emic and etic thinking; ability to recognize a knowledge gap; ability of intercultural communication; ability to recognize missing knowledge; comparative thinking ability; exchange capacity self-perception; ability to know how to compare the country; possess knowledge of other countries; possess diagnostic skills; understand the differentiation; ability to recognize trends in other cultures; understanding of cognitive complexity and cognitive integration. Besides experiencing limitations in their own cognitive maps, discovered, in other words, the educational system has not prepared for some of the things they face, and there are many things we are not aware. "The results are uncertainty and insecurity, which have cognitive and affective consequences, with respect to decision making and critical thinking" (Mestenhauser, 1998, p. 3).

By inhibiting as a defense mechanism, it is possible to protect the self-concept unexplored stimulus to such an extent that prevents the person function in an unfamiliar culture. Therefore it is important to raise awareness to the person of these defense mechanisms to minimize inhibition and to advance the learning and development (Trejo, 2011, p. 113).

Emotions and learning

It exists different theories and concepts about emotions. Each has a particular viewpoint regarding the reflection of reality. Older theories distinguish primary emotions (fear, anger, joy, sadness, trust, disgust, anticipation, surprise) and secondary emotions that are considered as a mixture of primary emotions. A close relationship between emotion and cognition, as well as motivation and behaviour is also assumed. With reference of Holodynski and Friedlmeier (1999) Siecke classified tree groups of paradigms of emotions: structuralist, functionalist and contextual (Siecke, 2010).

The functionalist paradigm is the dominant view today. However, the study focuses on the contextual paradigm, because the concept of social constructivism. This concept takes into account that emotions are not only specific personal experiences, but are rooted in culture. Each individual has to transform them into something personal and intrapsychic during the socialization process. Emotions and forms of regulation are built in interactions with other people together. Such feelings may be subject to rules, which in turn are embedded in social norms and expectations (Siecke, 2010, p. 33; Hochschild, 1990).

For self-directed learning process the presence of feelings subject to rules is also supported. Those rules take place in a certain culture of learning, characterized by norms, values, attitudes and behaviours of a group of people. The rules are involved in, for example, the implicit or explicit demonstrations, everyday wisdom, moral imperatives and requirements that influence the behaviour and emotional experience of the student. These rules may be present in materials and learning support as advice, as can be transmitted in an educational institution or a company (Siecke, 2007).

Upon approaching another culture, one receives outside stimuli of their own culture, which means organize them into a system of beliefs and values other than the known. This requires understanding and placed on a scale of foreign values thus measured and evaluated with a 'sheer scale' of the alien culture. It requires also understand himself in his personal story, and recognize their own culture in its social history, to the beliefs, values and norms. It seems to be less likely to happen when in contact with a foreign culture, because it demands a very intense rational and emotional work (Trejo, 2011: 110).

Focus and objective

It is a mixed approach used with predominant qualitative part. Are documenting different realities lived abroad and the impact of their experiences on academic and personal lives of students. It starts from assumptions that students are active participants in cultural, educational and social subsystems. Main questions are: What motivated students to study abroad? How can emotions affect learning abroad? Exist indication of increased cultural awareness and cultural learning?

Participants are 23 undergraduate students of mobility programs of the School of Public Accounting and Administration in a Mexican public university in the northeast of the country, take part of programs in French, Germany, Italy and Spain. The age of participants is between 19 and 20 years. The project consists of three phases, in which experiences are reported before, during and after the exchange. Survey with open questions in the different phases will be send to the participants, with a brief interview (Egan, J., 2008, p. 245). The information has been processed with content and discourse analyse. The project is limited to a case study for lack of various resources, also because the number of subjects is small and specific in training. The viability of information can only be described on the basis of data collection and interpretation of experiences of this group.

FINDINGS

Motivation to study abroad

Participation in an exchange program certainly for many students is the most moving part during the career, seeing the professional future, as expressed by one student: "This exchange is an opportunity to grow in all aspects, it helps to acquire knowledge, academically and culturally. Also today, the competition becomes more demanding, and we have to be prepared to take on challenges and develop in an international experience" (A04).

Also ambitious personal desires out a motivating source for the participation in these programs, as another student said: "...expand my network of contacts around the world, and ... I had the opportunity to come to a school where more than 30% of the students were from 38 or more countries, which would give me a great opportunity to meet people from all continents of the earth and to benefit me in both personally and professionally" (F08).

Another student expresses their expectations for the exchange, in addition to experiencing another culture and lifestyle, it is departing from an affluent daily life and experiencing true emancipation: "...also an important point is to become independent a bit, meaning that being away from my family and comfort that one usually has when you have it all at least in a simple way as it is having a family, desire to travel, meet different cultures outside of Italian culture; share a bit of Mexican culture" (I017).

Studying and teaching-learning techniques

Mentions a student: "I attend courses in the master's level, so I inquired about it. Here takes the master's level only 1 year and has less content than in Mexico, but despite having less content, the content is very rich in teaching and teachers take the time to explain each of the aspects of each topic. In a month of school we have seen only three subjects in each of one, when figuring seen in Mexico and about 5 topics or maybe more. Yet the emphasis on each topic is deeper, more personalized classes" (E01).

The extract shows a difference between academic level in Spain and Mexico. For this student it was not difficult coupling to study at a higher level.

Regarding the interaction between students is interesting the organization and cooperation to achieve a common goal, as another student has lived in France: "At school all were the work we do together. We made a final work area. I realized that here was customary to many team meetings for each job. In these we agreed on everything related person to person from agreeing on the issue, to review the final work instead of dividing all online. I felt very well work this way because, the real teamwork felt, and is part of the experience of living and working with international students" (F015).

Asking about academic work and what he is further complicated answers a student the following: "The matter that I find a bit more complicated Finance, since it is a lot of material, so I'll have to start getting ready with plenty of time to the final examination and also for the project. If I had to compare my academic work with that of Mexico, I think is a little busier pace in the German university, but I really like, since I'm in college with a very good academic level (A04). In this case the student realizes that deeper study is to prepare in advance and that is something unknown to her, despite a very good academic and linguistic level it has. Also tells another student the difficulty level of understanding: "There is a matter that personally makes me feel as if I had never studied a career, my forte is not finance, and this matter Investment Banking for me it was a headache, is, classes were based on the teacher talked and talked about issues that truly understood only 10% of the total, still I do not have a test but I feel as nervous as to finish the exam will be oral; I hope to be ready by then" (I016).

To be pursuing a subject that requires more dedication than it usually invests the student, the stress level increases and causes those symptoms. In addition we faced an oral examination, whereas in his career at the university of origin has not had to live. Such tests are not scheduled in the curriculum of his career. This lack in preparing academic culture that is different for example in Germany and Italy to that of Mexico is shown.

Self evaluation and lived emotions

The extent to which participants come to an assessment of their capabilities and achievements, what they learned over time while outside your country, this is intended to prove. In the descriptions, the students point out in particular that they had to take their lives into their own hands independently and responsibly, reaching a level of emancipation as a person, including managing time and money, to orient themselves in what they want to achieve in their life and what they have to do so soon, to fulfil it, moments to think ahead. It will increase the level of awareness for different moments of their life. Following are some excerpts from interviews:

"...Give me time to think why I'm here, what I am, what I really want, but most get everything I want, especially after this great achievement, which at first I took some sacrifices this exchange, like leaving my work, but in the end you think it's for good, and are perhaps opportunities later in life could not be similar; I also feel an increase in the sense of valuing what we have, whether much or little" (I016).

It supports the same students who participate in the exchange marked him emotionally, impact of several students is admitted: "... one of my wishes was to become independent a little, at least I could say that emotionally, and clear in this regard I feel a big change, emotional growth that strikes me the truth; I find few months I've been here and has been great this step, I can say that being on time alone ..." (I016).

Says another student to organize their achievements: "I feel that in the time I've been in France, I learned to better organize my time and money and therefore I have become more responsible" (F015).

Change in the cultural awareness

When faced with a different culture there are moments that impact both, which may impact the emotions experienced in personal development to realize secrets of the person. As a student expressed: "As to my way of seeing the world that has itself changed a lot, I always thought it was a very open to new things, but I've noticed no. Many things still surprise me nor my imaginary things, but small things like diversity in the meaning of freedom is not the same for a Frenchman to a Mexican or Moroccan. Cultural diversity is something you have to learn "(F021).

Another student expresses change in consciousness to change a habit of study: "I can also say now that changed a bit my way to study because now I do most days in advance because I am aware of the great content coming in the examination, when back in Mexico I used to do it a day earlier " (F020).

The same student admits a change in your personal and environmental consciousness, realizing you have matured and made responsible for their daily life: "As a person, I have noticed several changes. Apart from being responsible and punctual in school, also it became a daily habit for when out and do my thing. Another thing is that I became more independent, this thanks to I have to do things on my own, paying rent, banking, cooking, cleaning, managing my time and money, wash, etc. a lot of things I was not used to doing there and here I learned how. I have also become healthier since here way long to get to everything and also because it became a habit, you realize that one [no] need the car to do all your daily life and I like it because I caught affection for the city and when walking around. "(F020, [CD]).

CONCLUSIONS

The study points out some of the different realities lived abroad and how these experiences impact on academic and personal lives of undergraduate students in administrative sciences. It is noticed that students participating in exchange programs changed cultural awareness, as an increase in personal development. Participation in a mobility program increases the advance in cognitive, self, intercultural learning. Although the results extracted from the complete study can be structured under the following topics:

- 1) Personal factors such as increasing personal autonomy and academic improvement, changes in self-concept, increased tolerance, economic planning, capacity for coexistence, positive and negative aspects of the experience and increased level of frustration, if the own culturally conditioned ideas encounter other cultural realities. Loneliness in moments of sadness, knowledge of the language and culture of their own, like the realization of a dream enable participants to support changes in self-concept personal growth.
- 2) Educational factors as cognitive, self-directed and intercultural learning.
- 3) Academic factors as the duration of undergraduate studies note differences with the country of origin, which can be frustrating for students, if demand exceeds the level of personal attainment.
- 4) Supporting factors as preparation on intercultural aspects besides the linguistic, training the cultural aspects, including the academic culture among other tools to help develop intercultural competence.

References

- Arnold, R. (2005): Die emotionale Konstruktion der Wirklichkeit. *Pädagogischer Konstruktivismus, Teil III. GEW-Zeitung RLP, Sonderbeilage*, S. IX-XII.
- Bennett, M. (2009): *Defining, measuring, and facilitating intercultural learning: a conceptual introduction to the Intercultural Education doublesupplement*. Retrieved: http://www.idrinstitute.org/allegati/IDRI_t_Pubblicazioni/7/FILE_Documento.pdf
- De Wit, H. (2005): América Latina y Europa ante el fenómeno de la internacionalización. In: *Educación Superior – Convergencia entre América Latina y Europa*. Argentina, p. 222-226.
- Didou Aupetit, S. (2010): Mitos, expectativas y realidades de la movilidad estudiantil. *Meta política. Vol. 14*, pp. 70-83.
- Egan, J. (2008). Email Interview. In: Lisa M. Given (Ed.), *The Sage Encyclopedia of Qualitative Research Methods*. Thousand Oaks, CA: SAGE Publications, Inc, p. 245.
- Flick, U. (2000): *Qualitative Forschung*. Ein Handbuch. Verlag Rowohlt. Reinbek.
- Gacel-Ávila, J. (2012): Comprehensive Internationalisation in Latin America. *Higher Education Policy*, 25, pp. 493-510.
- Gadamer, H.-G. (2005): *Verdad y Método*. Vol. 1 y 2. 11a ed. Sígueme. Salamanca.
- Hochschild, A. R. (1990): *Das gekaufte Herz. Zur Kommerzialisierung der Gefühle*. Frankfurt a.M./New York.
- Holodynski, M.; Friedlmeier, W. (1999): Emotionale Entwicklung und Perspektiven ihrer Erforschung. In: Friedlmeier, W.; Holodynski, M. (Hrsg.): *Emotionale Entwicklung. Funktion, Regulation und soziokultureller Kontext von Emotionen*. (pp. 1–26). Heidelberg/Berlin.
- Knowles, M (1975): *Self-Directed Learning. A Guide for Learners and Teachers*. Chicago.

- Mestenhauser, J. A. (1998): Internationalization of Higher Education: A cognitive Response to the Challenge of the Twenty-first Century. *International Education Forum* 18. 1-2, pp.1-8.
- Mayring, Ph. (2000). Qualitative Inhaltsanalyse. In U. Flick (Ed.), *Qualitative Forschung*. Verlag Rowohlt. Reinbek, pp. 468-475.
- Schütz, A.; Luckmann, Th. (2003) *Strukturen der Lebenswelt*. UVK Verlagsgesellschaft mbH, Konstanz.
- Siecke, B. (2007): *Lernen und Emotionen. Zur didaktischen Relevanz von Emotionskonzepten im Kontext beruflicher Bildung*. Bielefeld.
- Siecke, B. (2010): Emotionen, Emotionskonzepte und Denkmodelle: Welche Bedeutung haben sie für das selbstgesteuerte Lernen? En: *CSPC e-Learning der Zürcher Fachhochschule, E-Dossier #07*, pp 31-35. Retrieved: www/phzh.ch/PageFiles/24077/CSPC_eDossier_07.pdf
- Trejo, L. (2011): *Crisis y Transición. Proceso de cambio en un grupo de estudiantes mexicanos en Europa*. Universidad Autónoma de Nuevo León, México.

Values And Value Orientation Of High School Students

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ABSTRACT

In the presented paper, we analyze preferred values and value orientations of high school students. The research sample composed of 168 students of three high schools (99 women and 69 men). To measure values and value orientation of the research sample, we have applied the abridged version of the Portrait Value Questionnaire methodology. We've focused on the value and value orientation preferences as well as onto differences in value preferences considering gender of the respondents. We've found out that the students mostly prefer *hedonism*, *self-direction*, *benevolence*, *stimulation* and *safety*, whereas for women the most important value is *benevolence*, for men *safety* and *power* are of biggest importance. Significant difference in favor of women was demonstrated only in value orientation of *self-transcendence*.

INTRODUCTION

According to Prunner (2002), value can be understood in its three meanings – value as a quality of things that people strive to achieve (focus onto satisfaction of human needs), value as a positive appreciation of the object of human relations (relationships) and value as a general criterion used to assess various objects. This understanding enables us to define the importance of values to a person as such and becomes a basis for the evaluation of the importance of values for the person when pursuing orientation in social context (Prunner, 2002).

The pedagogical dictionary describes value as a subjective appreciation or an importance rate that the individual aligns to certain things, phenomena, symbols or other people. Values are being adopted in the process of socialization and acculturation. From the pedagogic point of view, the most important are: youth value systems, education as a social value and values and attitudes as a part of goals and content of school education (Průcha, 2008).

After family, the school is the second most important socializing agent. Individuals establish many contacts with same-age students in the school, they get to know ways of social life, integrate in the school collective, create new value structures. Adolescence is particularly sensitive period of time for an individual to construct personal identity. Adolescent confronts his values, goals, attitudes that were presented to him by parents, school, peers or other social groups. As Andreánska a Cabanová state, students are more satisfied in a class with good relationships, what reflects in their learning activities (Andreánska, Cabanová, 2012) However in reality, we witness various problems in schools – risky behavior, disturbed social relationships in family as well as in same-age groups, disinterest in education, lack of hobbies etc. According to Kraus, currently the life passes way too fast and does not create sufficient space for continual incorporation into society, we lack necessary patterns and the whole process of social maturation reduces to practical living. This results into a fact that young people often live from one day to another, not having any long-term goals, not maintaining greater spiritual values, not spending their time valuably (Kraus et al., 2006). The aforementioned makes us pose a question, what kind of value system do high school students live up to?

THE STUDY

Research goal and research questions:

The goal of our research was to find out about value preferences and value orientation of high school students considering their gender.

We have formulated following research questions:

1. What kind of value system do high school students maintain?
2. Is there a difference between values of male and female students?

Method and research sample:

The research sample composed of 168 students (hereof 99 women and 69 men) of 1st and 4th grade of various high school types with the average age of 17, 2 years.

The Schwartz values questionnaire (PVQ-Portrait Values Questionnaire) was used to measure the nature of represented values (developed by Schwartz, 1994). From the original 40-item methodology, we've abstracted its abridged 21-item version known as *Portrait Value Questionnaire* (Schwartz, 1994, 2003). The questionnaire

consists of 21 characters of persons and the task of participants was to indicate at a 6-point asymmetric unipolar categorical scale (very much like me, like me, somewhat like me, a little like me, not like me, not like me at all), how much they resemble given portraits. Given portraits of people surveyed ten values: power, achievement, hedonism, stimulation, self-determination, universalism, benevolence, tradition, conformity, security (the value of the first order). Ten values were possible to combine into four levels higher, i.e. 2nd order – value orientations (Self-Enhancement, Self-Transcendence, Openness to change, Conservation).

FINDINGS

According to performed measurements, the students prefer following values the most: *hedonism* (being characterized by joy and enjoyment of life), *self-direction* (necessity to stay independent, to make up new things constantly), *benevolence* (readiness to help, loyalty towards own friends), *stimulation* (characterized by excitement, life challenges, life changes, courage, turbulent and exciting life) and *safety* (own family and own nation, adherence to social order). A little less preferred were *success* (ambitions, achievement of own goals, demonstration of own competences and abilities, receiving recognition from others), *tradition* (respect, acceptance of customs and ideas anchored in traditional culture or religion, avoidance of extreme situations in life or behavior, acceptance of circumstances of life), *power* (social status and prestige, feeling of strength, tendency to order and control others, demonstration of own domination), *conformity* (control over own acts, tendencies and impulses – not to break social expectations or social norms, courteous and polite behavior, honoring parents and seniors) and the least preferable value was *universalism* (defined by understanding, appreciation, tolerance, inner harmony, society and nature protection) (Figure 1)

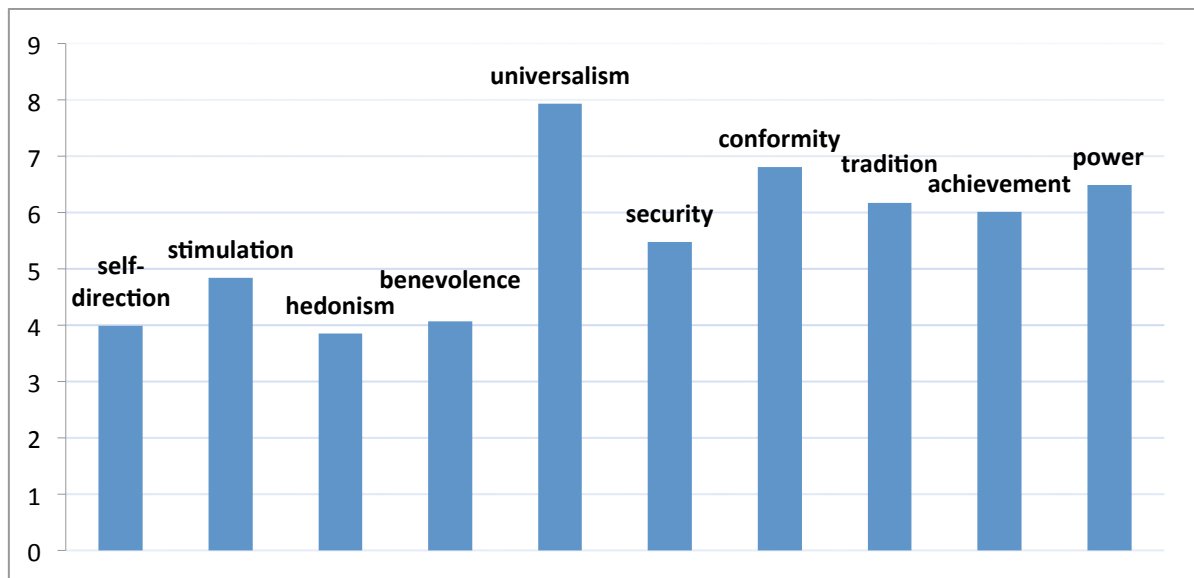


Figure 1 Preferred order of high school students' values (N=168)

Considering preferred value orientation it is obvious that the students incline to *conservation* (composing of values: safety, conformity and tradition). The other value orientations as *openness to change* (infused with hedonism, stimulation and self-direction), *self-enhancement* (determined by success and power) and *self-transcendence* (defined by values: universalism and benevolence) were preferred by respondents in approximately the same ratio (Figure 2).

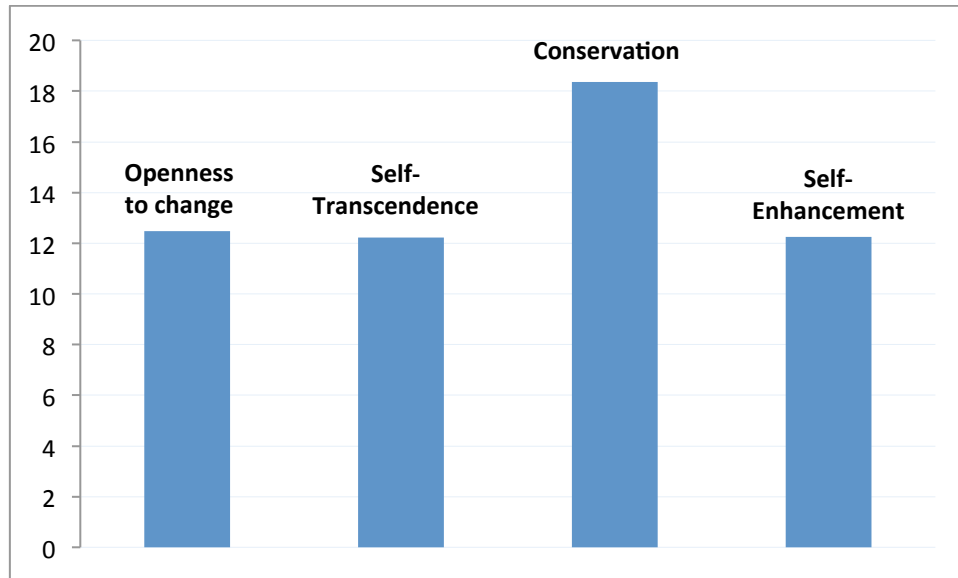


Figure 2 Preferred order of high school students' value orientation (N=168)

Data describing gender differences between the groups of men and women in particular values and value orientations are stated in Table 1. Significant differences were measured in values *benevolence*, *safety* and *power*, whereas for women, the value of *benevolence* being characterized by readiness to help and loyalty towards own friends is more important. For men values of *safety* (own family and nation, adherence to social order) and *power* (directed onto social status and prestige, feeling of strength, tendency to order and control others, demonstration of own domination) were of greater importance. Significant difference in favor of women was witnessed only in one value orientation of *self-transcendence* empowered by values of benevolence and universalism (Table 1).

Table 1 Difference between high school students' value and value orientation preferences

Values and value orientation	Mean women (N=99)	Mean men (N=69)	t-test	significance
Self-determination	4,06	3,70	1,365	0,174
Stimulation	4,98	4,45	1,680	0,095
Hedonism	3,91	3,64	0,919	0,359
Benevolence	3,75	4,48	2,764	0,006
Universalism	7,86	8,64	1,808	0,072
Security	5,88	5,06	2,387	0,018
Conformity	6,91	6,39	1,337	0,183
Tradition	6,16	6,06	0,341	0,734
Achievement	5,86	6,14	0,707	0,481
Power	6,90	5,39	3,934	0,000
Openness to change	12,95	11,78	1,866	0,064
Self-Transcendence	11,61	13,12	2,561	0,011
Conservation	18,95	17,51	1,944	0,054
Self - Enhancement	12,76	11,54	1,829	0,069

CONCLUSIONS

Knowledge about values and value orientation is considered to be one of the key research areas of psychology, but also pedagogy. As Vernarcová (2005) states that a truly universal set of human values does exist and people's attitudes are based on the relatively few, stable values they hold. We aimed to know which values and value orientations are preferred by high school students and if there is a difference between preferences of men and women.

Based on performed measurements, the most preferred values by students were *hedonism*, *self-direction*, *benevolence*, *stimulation* and *safety*, whereof women found *benevolence* and men *safety* and *power* the most important. Therefore we came to a conclusion that the value orientation of men and the one of women are not so very different, the only significant difference in favor of women was shown in value orientation of *self-transcendence*. Our experience, knowledge and value orientation significantly influence our behavioral patterns. Hierarchy of values is considered to be the most reliable prognostic sign indicating if a person is able to behave in compliance with the environment, so Rosová (Huba, 2002).

Values represent one of the major sources of human motivation, which gives a person meaning and direction of his efforts. They are present during the decision making process, they affect the mental processes of perception; survival and they are transformed into the ruling personalities (Šramová, Džupina, Jurášková, 2013). In the society, the value system of a person is constantly confronted with alternatives, outer pressures and societal changes that have great influence on young people as well as educational system. According to Poliaková, education should be a process of personality cultivation. (Poliaková, 2013). Forming of values and value orientation of students doubtlessly is its important part.

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References

- Andreánska, V. & Cabanová, K. (2012). Psychologická príprava špeciálnych pedagógov. In *Špeciálna pedagogika na Slovensku v kontexte rokov 1967-2012* (pp.80-82). Bratislava: Iris.
- Huba, M. (2002). *Eudské hodnoty kompatibilné s trvalo udržateľným spôsobom života. Spoločnosť pre trvalo udržateľný život*. [online]. Available: <<http://www.stuz.cz/Zpravodaje/Zpravodaj002/huba.htm>>
- Kraus, B. et al. (2006). *Středoškolská mládež a její svět na přelomu století*. Brno: Paido.
- Poliaková, E. (2013). Funkcionálna hodnota vzdelávania a kariérneho poradenstva ako garanti sociálneho vzostupu a príležitostí. In E. Gajdošová (Ed.), *Psychologické aspekty kvality školy* (pp. 36-38). Nitra: POLYMEDIA.
- Prunner, P. (2002). *Výskum hodnot*. Plzeň: EROVERLAG.
- Průcha, J. (2008). *Pedagogický slovník*. Praha: Portál.
- Schwartz, S. H. (1994). Are There Universal Aspects in the Structure and Contents of Human Values? *Journal of Social Issues*, 50, pp. 19-45.
- Schwartz, S. H. (2003). *A Proposal for Measuring Value Orientations across Nations. Chapter 7 in the Questionnaire Development Package of the European Social Survey*. [Online] Available: <http://www.Europeansocialsurvey.org>.
- Šramová, B., Džupina, M. & Jurášková, O. (2013). Impact of value structure on brand engagement depending on degree of self-esteem of adolescents. *International Journal of Innovation and Applied Studies*. Vol. 3, No. 4, pp. 931-940.
- Vernarcová, J. (2005). *Sociálna a pedagogická psychológia*. Nitra: SPU.